NOVEMBER, 1942

ELECTRICAL SOUTH

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52-In Hotel Type

FANS by HUNTER-CENTURY

55th SEASON

24-In "Airspread" Ceiling

HUNTER, who has made fans and ventilators exclusively during 55 years, is now operating under War Production Board restrictions. • No more fans will be made except for the Army, Navy and Maritime Commission. • HUNTER unfilled orders now on hand represent only direct contracts with Government Agencies. • Additional supplies of certain types can be made available for Government hospitals and Army and Navy projects.

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THIS STARTER THAT SAYS:

"I'm 'on'
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I'm 'tripped'"

Motor Watchman
Class 10-100
Size 1

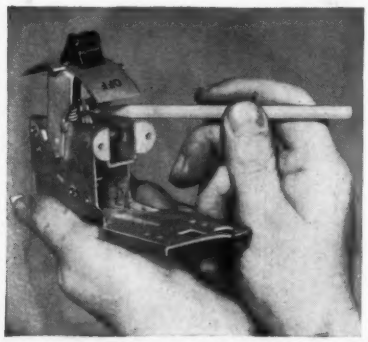
SAVES TIME
SAVES
MISTAKES!

WESTINGHOUSE "De-ion" MOTOR WATCHMAN MANUAL STARTERS FOR A-C MOTORS UP TO 7½ HP

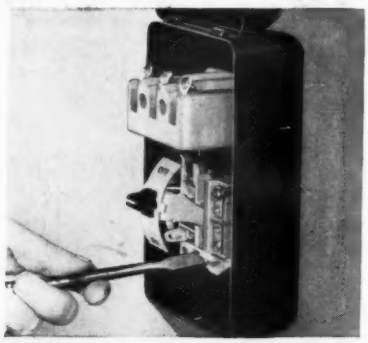
No question with the Motor Watchman, whether it is "ON" or "OFF," or whether an overload has caused it to trip and disconnect the motor. ALL THREE circuit conditions—"ON"—"OFF"—or "TRIPPED"—are clearly indicated by the handy toggle switch.

Toggle switch operation makes jogging motors for indexing easier, too. One hand does the job—quickly, accurately! "De-ion" Arc Quenchers prolong contact life—Bi-metal overload relay gives unvarying, factory-calibrated protection—straight-through wiring and keyhole mounting holes make installation easy. Order from your nearest Westinghouse Agent today. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. J-21183-A

QUICK-MAKE as well as quick-break action prevents "teasing" of contacts. Contacts cannot be held partially closed. Arcing is reduced—contact life lengthened.

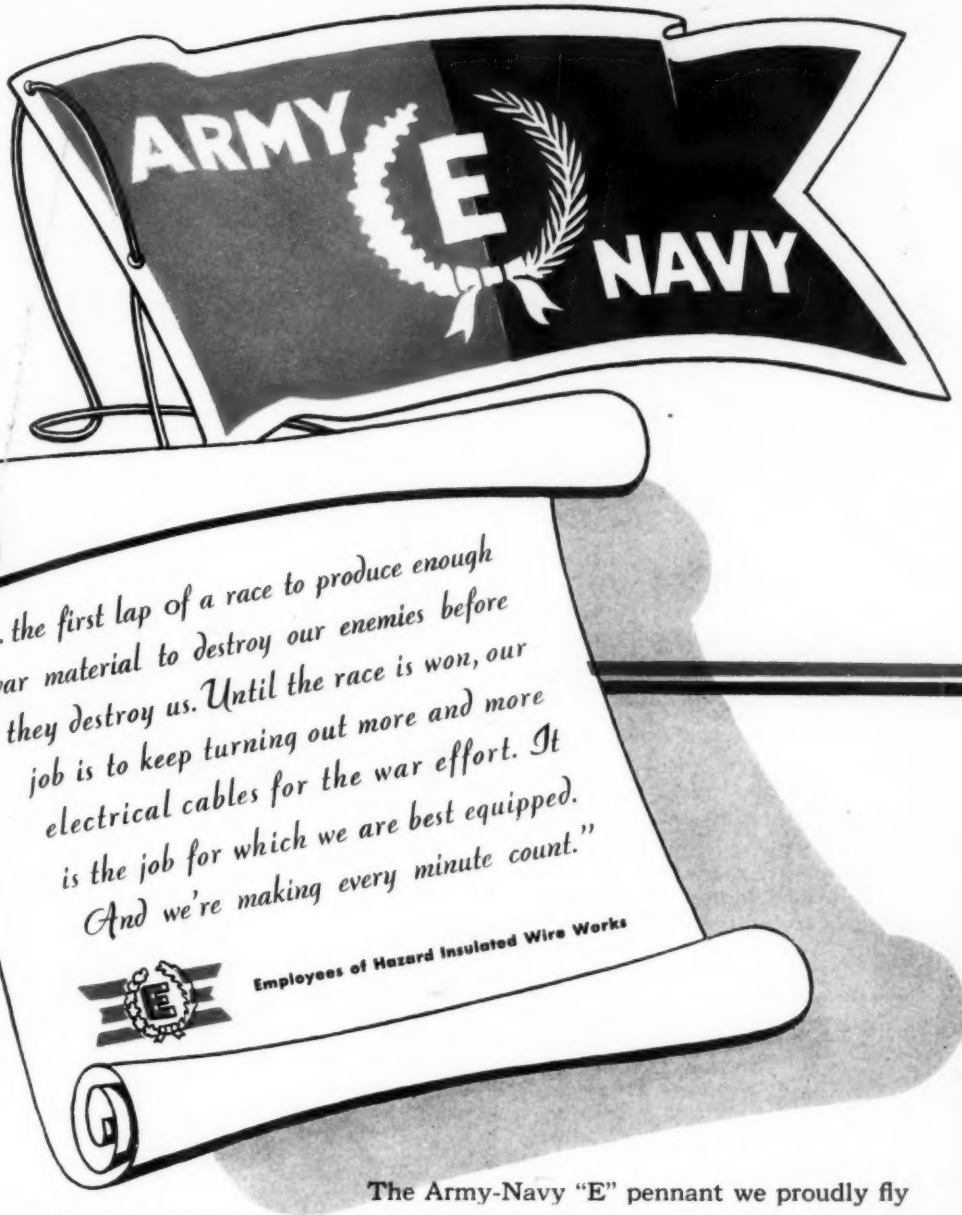


EASY TO INSTALL... terminals are out in the open, easy to get at. Through wiring, together with ample wiring space makes installation quick and simple.



Westinghouse

"This is only the first lap . . .



. . . the first lap of a race to produce enough war material to destroy our enemies before they destroy us. Until the race is won, our job is to keep turning out more and more electrical cables for the war effort. It is the job for which we are best equipped. And we're making every minute count."

Employees of Hazard Insulated Wire Works

The Army-Navy "E" pennant we proudly fly tells the world that our plants are running day and night to meet the demands of our armed forces for insulated wires and cables. It means, too, that we cannot always fulfill the needs of our other customers on time — yet we are doing everything in our power to help them. But winning the war *must* come first.

3145

HAZARD INSULATED WIRE WORKS

DIVISION OF THE OKONITE COMPANY

Wilkes-Barre, Pennsylvania — Offices in Principal Cities

BUY U. S. WAR BONDS — Every Payday All Hazard Employees BUY U. S. WAR BONDS

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Volume 22 Number 11

Enlist that Scrap

... FOR THE DURATION

When you turn in your scrap *this month*, your obligation does not end. For the steel furnaces must run next month, too -- and the next -- and the next.

Steel production of eighty-five to ninety million tons of ingots a year calls for approximately 3,000,000 tons of scrap per month--about 750,000 tons a week--over 100,000 tons a day. Half of this comes from the industry itself, but the other half must come from the public.

Reduced to its simplest terms, if the steel industry is to produce steel at the rate and in the volume that our war program demands, then America must collect nearly ONE POUND OF SCRAP EVERY DAY for each man, woman and child in the nation.

You, the reader of this publication, have this clear, individual obligation: As a patriotic citizen and a responsible executive or workman, you must act to the extent of your ability to KEEP SCRAP FLOWING to the steel plants.

Do your part to enlist scrap for the duration.

WHY NOT TRY THIS YOUNGSTOWN IDEA?

Red-white-and-blue barrels like this stand on important street corners, in both business and residential districts of Youngstown, Ohio. They provide a convenient and tangible means of getting action from citizens, young and old, who are bombarded daily with radio, newspaper, magazine and other advertising urging them to turn in scrap.

That this is an effective idea is proven by the fact that two city trucks are kept busy every day, collecting scrap from these barrels and answering calls from householders who have other scrap to contribute, too large to go into the barrels. Perhaps YOUR city can try this plan, too.

This Company joins in the counter attack against accidents by subscribing to the National Safety Council's War Production Fund to Conserve Manpower.

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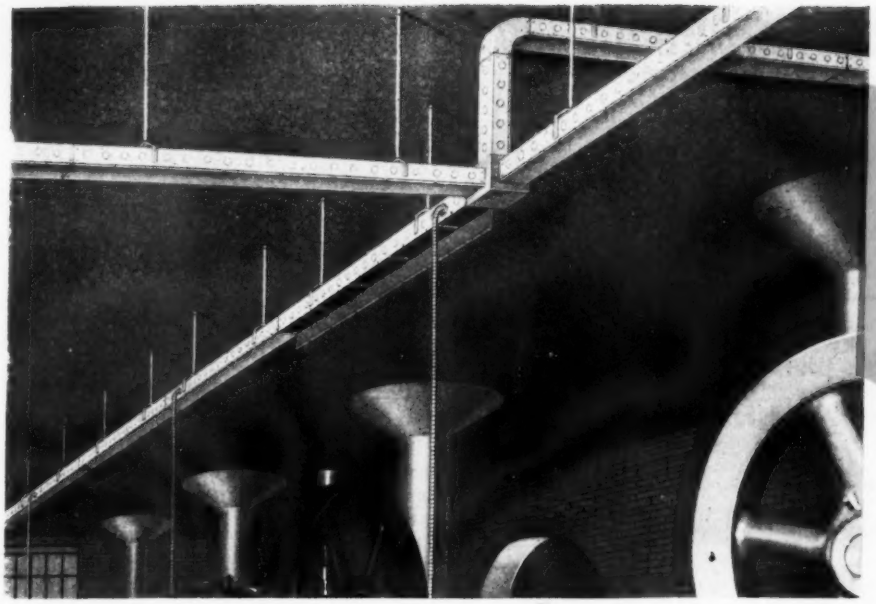
THE YOUNGSTOWN SHEET AND TUBE COMPANY
YOUNGSTOWN, OHIO



Maximum Flexibility is assured with these (FA) WIRDUCT ACCESSORIES

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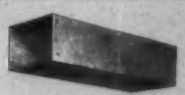
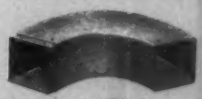
Standard Coupling

Flanged Coupling

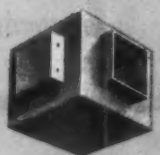
Flanged Coupling Box



Expansion Coupling



Curved Elbow



Pull Box

For Flexibility *and* Accessibility

enclose wires and cables in (FA) Wirduct. It provides a complete duct system of distribution for light, heat and power, and control wires as permitted under the 1940 National Electrical Code rules.

(FA) Wirduct forms a very flexible distribution system. Standard sections are 10 feet long, and 2, 4 and 6 foot sections are also available. These, with pull boxes, elbows, and closures, tees, crosses, and the various forms of couplings, make it possible to fit any desired arrangement. The 2½" x 2½", 4" x 4" and 6" x 6" sizes are made regularly with full-length flanged hinge cover, but can also be supplied with screw cover. All larger sizes have screw cover.

Standard sections are furnished with concentric knockouts on 3 sides, spaced 6" on centers, for ½", ¾", 1" and 1½" conduit, so that connections may be made at any desired point. There are also knockouts for the fastening screws or mounting brackets.

Use the experience of the (FA) Sales-Engineer

in planning and designing an efficient and convenient (FA) Wirduct distribution system. No obligation, of course. Write for name and address of the one nearest you. Bulletin 66 gives details. . . . If you are planning a light and power installation with capacities in excess of those permitted in (FA) Wirduct, we recommend (FA) Busduct, fully described in Bulletin 65. Either or both bulletins sent promptly on request . . . Frank Adam Electric Co., St. Louis, Mo.

Standard 10 ft. section, with hinged cover, showing location of knockouts

EST. 1891 — THE SIGN OF A (FA) BETTER JOB

Frank Adam

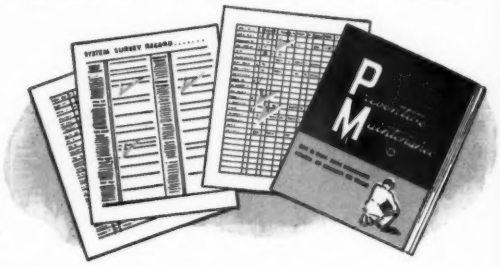
ELECTRICAL PRODUCTS

for War Industry

FRANK ADAM ELECTRIC CO.
ST. LOUIS, MO. U.S.A.

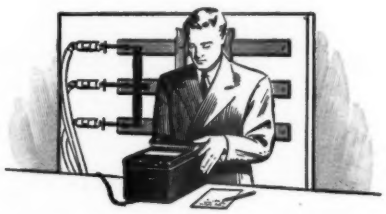
How to stop production losses through Anaconda's PREVENTIVE MAINTENANCE Plan

1 **Send for this plan designed to prevent electrical system failures before they develop.**



With raw materials so critical—copper and rubber especially—Anaconda has developed a plan to help industry protect its electrical systems and at the same time, conserve critical materials. It is a practical, simplified manual prepared to meet wartime conditions.

2 **Use this plan periodically to check your electrical system for imminent failure.**



Manual includes special charts for analyzing your plant's electrical system, and for keeping a running check on its condition. Automatically uncovers danger spots . . . suggests a practical remedy for potential weaknesses.

3 **If the plan uncovers any critical complications, consult with Anaconda engineers.**

On critical problems, we offer the services of our engineering department and field service staff without cost.

NOTE: The Preventive Maintenance Plan will aid your local W.P.B. Branch in making its decision on your request for material required to avert an actual breakdown. 42277

"Tomorrow may be too late . . . do it today!"

ANACONDA'S PREVENTIVE MAINTENANCE PLAN

Anaconda Wire & Cable Company
25 Broadway, New York City

Please send copy of the Anaconda PM Plan, including posters, extra check charts, etc.

Individual .....

Company .....

Address ..... City .....

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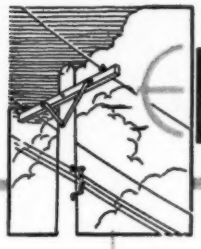
NOVEMBER
1942

Volume 22 No. 11



ELECTRICAL SOUTH

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ATLANTA, GEORGIA

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How The Lighting Industry is Meeting a Challenge!

THE lighting industry today is meeting the challenge of increasing night production to the level of daytime production. In many converted war plants, here is what happens on the "after dark" shift:

1. *Rejects are higher.*
2. *More material is wasted.*
3. *Fatigue increases faster.*
4. *Accidents are more numerous.*
5. *Quality of work is poorer.*
6. *The production rate is lower.*
7. *The number of employees who fail to show up for work is larger.*

Basically, in practically every plant where these things occur, the cause is poor lighting. Whereas day shifts enjoy the benefits of both daylight and artificial illumination, after-dark shifts depend on artificial lighting alone . . . and in most converted war plants, the existing lighting systems were designed primarily to supplement daylight. They were not meant to provide the necessary seeing light for the type of prolonged work that now goes on all through the dark hours.

GLARE

WHAT'S WRONG WITH THE LIGHTING?

In plants where lighting surveys have been made, three types of "lighting bottlenecks" are most prevalent:

1. Glare is one of the most frequent difficulties. Often it is even worse at night because contrasts are greater.

2. Shadows are another bad offender . . . shadows that hide details, create false conclusions, and conceal hazardous conditions.

3. Insufficient light the third trouble, is frequently caused by improperly placed lighting fixtures, by dirt and dust on lamps and fixtures that reduce their efficiency as much as 50%, or by use of wrong size lamps.

SHADOWS

WHAT CAN BE DONE ABOUT IT? Many of these converted plants realize their lighting is inadequate but don't realize how simply and inexpensively it can be improved. Many of them are amazed when lighting men show them how even a few simple changes (see box) provide the better light they needed.

INSUFFICIENT LIGHT

To increase the production ratio on night shifts is, in effect, the equivalent of putting more factories to work to speed the war effort . . . and at infinitely less cost.

The lighting industry is meeting this challenge to help end the war sooner by breaking many of the production bottlenecks caused by poor lighting.

Toward this end, General Electric lighting men gladly pledge their time, skill, and experience . . . remembering that their job is *not to sell, but to serve.* General Electric Company, Nela Park, Cleveland, Ohio.

SIMPLE THINGS LIKE THESE ARE INCREASING LIGHTING EFFICIENCY. . . STEPPING UP NIGHT SHIFT PRODUCTION!

1. Have a regular cleaning schedule for bulbs and fixtures.
2. Make sure right size bulbs are used in present fixtures.
3. Relocate present lighting to fit new demands.
4. Add supplementary lighting for the most critical seeing operations, such as inspections.
5. Re-paint walls a light color to reduce light absorption; paint machinery a light color to increase visibility.
6. Make frequent light meter checks on maintenance.
7. Recommend new lighting equipment *only* when it is essential.

G-E MAZDA LAMPS

GENERAL ELECTRIC

Lighting War-Time Offices

Painting and fixture maintenance as a means of getting increased illumination take on new importance in these days of material shortages and increased lighting needs.

By John J. Neidhart*

ADEQUATE LIGHTING is vital to our war effort, for it leads to increased production, fewer errors, and improved employee morale. The benefits of proper lighting are generally recognized today, but the important role played by painting and proper maintenance of the lighting equipment is frequently overlooked. Light color, high reflection factor surfaces are essential for maximum utilization of the light, best diffusion and optimum seeing comfort. Proper maintenance is necessary for the preservation and most efficient operation of the lighting equipment. Neglecting painting and maintenance is wasteful, and we cannot afford wasteful practices — especially when we are at war.

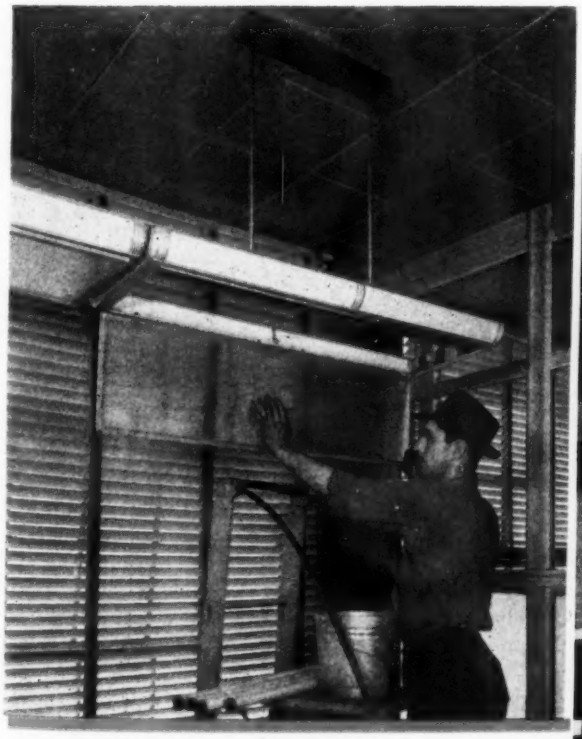
Although the recommendations outlined herein will improve almost any lighting installation whether it be new or old, they will not convert a poor installation into a good one. There are many other factors involved in what constitutes good and bad lighting which we shall not dwell upon at this time.

*Mr. Neidhart is lighting engineer for Westinghouse Electric and Manufacturing Company, Cleveland, Ohio.

Effect of Paint on Light

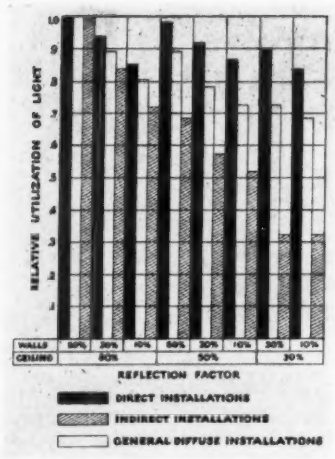
The three major characteristics governing the selection of the paint to be used are:

1. Reflectivity
2. Finish
3. Color.



Frequent washing of lamps, glassware and reflecting surfaces of luminaires is essential to the maintenance of a high level of illumination. Lighting equipment should be cleaned with soap and water, for dry-wiping will remove only a portion of the dirt and damage surfaces.

The illumination provided by the semi-indirect fluorescent installation in this office will be increased 20 per cent or more by repainting the 50 per cent reflection factor, cream-colored ceiling with an egg shell white paint having a reflectivity of 80 per cent.



Graph showing relative utilization of lighting for various ceiling and wall reflection factors.

The reflectivity of the ceiling paint should be 80% or more and that of the walls should be 50-60%. Although the reflection factor is primarily determined by the nature of the paint itself, it can be shown that thin coats of paint have a much lower reflection factor than heavy coats. It would, therefore, be false economy to try to save money on a painting job by applying only one thin coat.

It is very important that the paint have a flat or egg-shell finish, for a glossy finish will cause specular reflections of the light sources and annoying glare will result. Although many people are under the erroneous impression that a glossy finish will not depreciate as rapidly as a flat or egg-shell finish, tests have been made which show the reverse to be true.

The ceiling should always be painted a flat or egg-shell white, but the walls may be painted any light color with egg-shell surface. The whites are often tinted slightly with blues or yellows, but the natural or warm whites depreciate much less with age than do the blued whites.

The color of the paint used on the walls may tend to have a psychological effect upon some of the employees. It has been found that colors in the blue end of the spectrum tend to create a rather cool atmosphere while the colors near the red end of the spectrum create a warmer and possibly more friendly atmosphere. The ivories and creams which are so frequently used may be classed as warm although they are apt to become tiresome. Reds and oranges should be avoided, because they may prove irritating, and the blues at the other extreme are usually too cold. A light blue-green or yellow-green seems to be a happy medium, for it is near the center of the spectrum and is a cheerful or friendly color. Greens, ivories, and creams are generally the most desirable colors to use.

In selecting a color, however, it is very important that the color sample be examined under the light with which it is to be used, for many colors are apt to have an entirely different appearance under various types of lighting.

Benefits of Painting

Light ceilings are especially important with indirect lighting installations, because the ceiling must act as a secondary reflector and in effect becomes the light source. This does not mean, however, that light ceilings are not important with other types of lighting installations. Regardless of the type of lighting, a high re-

(*Continued on page 53*)

Maximum utilization and diffusion of the light from the fluorescent continuous strip installation in this large office is assured by the high reflection factor ceilings and walls. Light ceilings and walls are especially important in narrow offices where the desks are located near the walls. Dark surfaces would lead to non-uniformity and less light.

(Top) Since the ceiling must act as a secondary source of illumination for this luminous indirect lighting installation, it is essential that the ceiling have a high reflectivity so that a high percentage of the light will be re-directed down upon the working areas. (Below) This semi-indirect fluorescent lighting system is dependent upon high reflection factor ceilings and walls for efficient utilization of the light and optimum diffusion and uniformity.

Protection for Motor Circuits

By B. Z. Segall*

This is another of the series of articles on Industrial Wiring Practice. This and the article to follow next month discuss the general requirements entering into the protection of motor circuits against overloads and short circuits. Articles to follow will consider specific examples illustrating the application of the general rules.

EVERY MOTOR must be protected from overloads. This protection, however, must not exceed certain limits for beyond them the motors, the controls, the branch circuit wiring, etc., will be subjected to excessive heating and subsequent breakdown. The branch circuit overcurrent devices protecting the motors from "short circuits" and grounds will be referred to quite frequently in this article. The actual requirements on its size, its method of starting, and its type.

Five different Code sections have been set up for establishing standards of motor running protection. These explain all the rules for the running overcurrent protection of:

(a) Wound-rotor motor secondary conductors.
(b) Motors rated ⅛ hp and smaller and automatically started.
(c) Motors rated ⅛ hp to 1 hp and automatically started.
(d) Motors rated 1 hp and smaller and manually started.
(e) Motor rated 1 hp and larger.

With the exception of the first classification these rules apply in general to all types of motors, a-c or d-c.

The discussion of these design principles will bring out the latest changes recommended by the Code. These new Code rules and changes have been developed to clear up certain requirements and to eliminate conflicts that exist between the rules as they now appear in the Code. This specifically applies to the rules for the motors rated at 1 hp and larger and for the manually started motors rated at 1 hp and smaller.

The secondaries of the wound-rotor types of motors are inherently dependent upon the stator of the motor for its loading. If the conductors feeding the stator are properly protected for running overcurrent then the rotor (secondary windings) will be protected from overloads. (See Fig. 29.)

A motor rated at ⅛ hp or less and operated by an automatic starting device (see Fig. 30) is usually connected to a branch circuit serving other motors or other loads. The branch circuit will have proper protective devices as required by the rules of Article

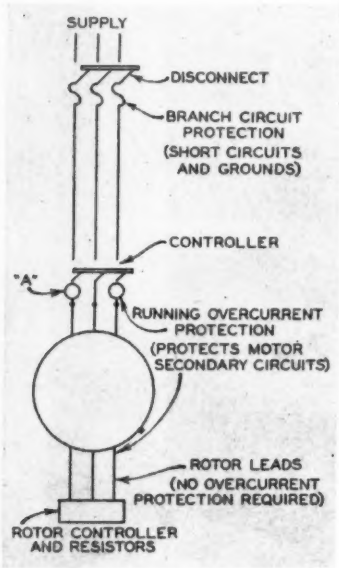


Fig. 29. This diagram indicates the fact that secondaries of wound-rotor types of motors are inherently dependent upon the stator of the motor for its loading. If the supply conductors are properly protected for running overcurrent, then the rotor circuit will be protected from overload.

for this protection will, however, be discussed in a subsequent article.

The design of the motor running overcurrent protective device depends on the type of duty involved, that is continuous duty, intermittent duty, etc. A continuous-duty motor's running overcurrent protection is dependent

*Mr. Segall is associated with the New Orleans Public Service, Inc., New Orleans, La.

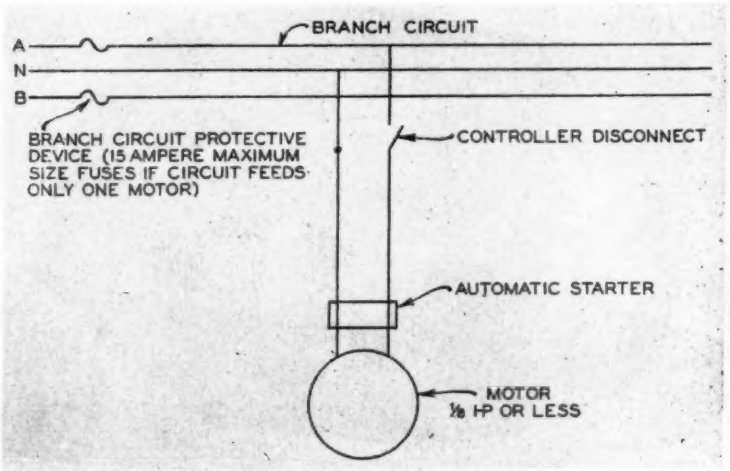


Fig. 30. For motors rated at ⅛ hp or less and operated by an automatic starting device, the branch circuit protective devices are considered to offer proper protection.

210 of the Code, and these are considered to offer proper protection to the motor. If for any reason a single branch circuit is designed for a motor rated at ⅛ hp or less then it will be connected to a 15-ampere branch circuit which will properly protect the motor from overloads.

A motor rated at ⅛ to 1 hp and which is automatically started may be considered protected from overcurrent if one of the following conditions prevails (see Fig. 31):

(1) The motor has running overcurrent protective device rated at 140% or less of the motor's full load current rating. This overcurrent device must, of course, have sufficient time delay to permit the motor to start and accelerate its load. (As will be explained below, the usual rating is 125% of the motor full load current rating.) These fractional hp motors have a much larger starting current than do the larger sized motors, therefore, a greater percentage current over-rating is permitted for these running overcurrent devices. For example, tests made show that ¼ hp, 110-volt, single-phase motors may draw as much as 25 or 30 amperes on starting, viz, 10 to 12 times the motors full load rated current. "Thermatrips," "Fusetrons," "Fustats," etc., provide excellent running protection for these motors.

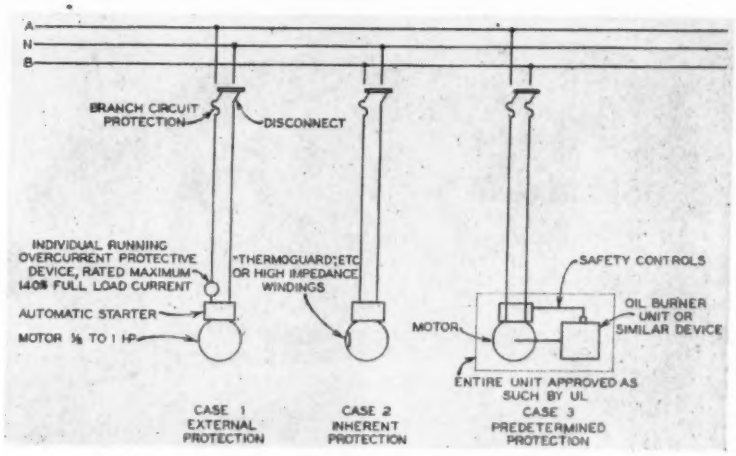


Fig. 31. Motors rated at ⅛ to 1 hp, which are automatically started, may be protected from overcurrent by several different methods as illustrated here. These include: external protection, inherent protection, and predetermined protection. (These methods apply also to manually started motors of 1 hp or smaller located out of sight of operator. See Fig. 32.)

(2) The motor may be designed so that it cannot overheat if it fails to start or is overloaded. A fine print note indicates how this may be accomplished, (a) by high impedance windings, or (b) by a device which is an integral part of the motor. The Westinghouse "Thermoguard" is an excellent example of the second method. This thermal disc is directly affected by the stator winding temperature since it is installed inside the motor frame near these windings. High temperatures caused by overloads or stalled motors cause the bi-metallic disc to open its contacts and this disconnects the motor from the line.

(3) The third condition provides for a fractional-horsepower motor which is part of an approved assembly. The entire unit, motor and associated load equipment, is checked by the Underwriters' Laboratories to determine if the motor in normal operation is subjected to overloads. Also, the unit is usually equipped with safety controls which will not permit the

(Continued on page 25)

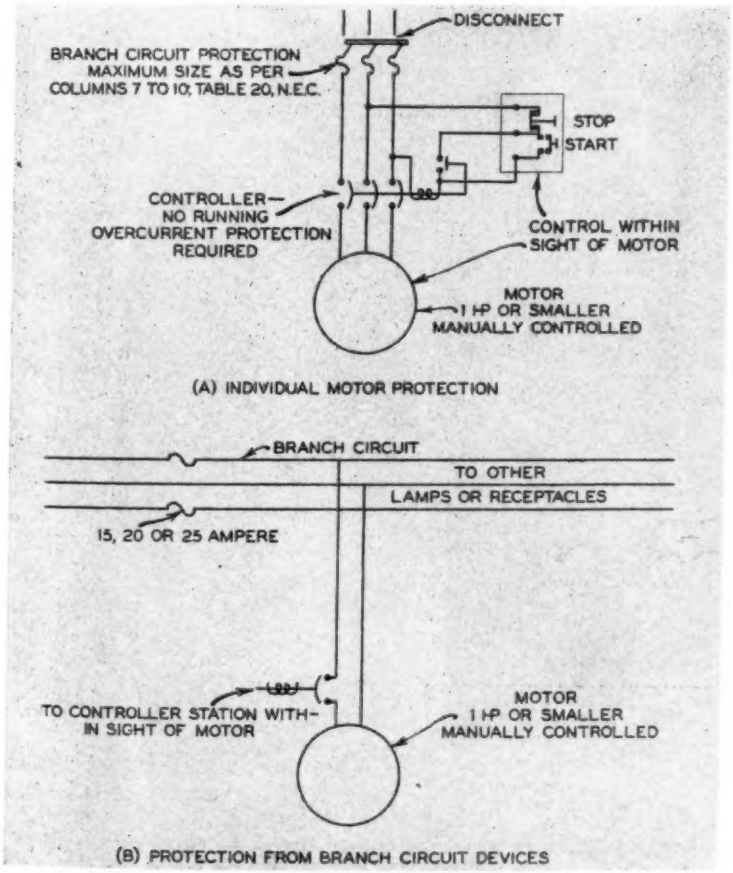

DISCONNECT
BRANCH CIRCUIT PROTECTION MAXIMUM SIZE AS PER COLUMNS 7 TO 10, TABLE 20, N.E.C.
STOP
START
CONTROLLER— NO RUNNING OVERCURRENT PROTECTION REQUIRED
CONTROL WITHIN SIGHT OF MOTOR
MOTOR 1 HP OR SMALLER MANUALLY CONTROLLED
(A) INDIVIDUAL MOTOR PROTECTION
BRANCH CIRCUIT
TO OTHER LAMPS OR RECEPTACLES
15, 20 OR 25 AMPERE
TO CONTROLLER STATION WITHIN SIGHT OF MOTOR
MOTOR 1 HP OR SMALLER MANUALLY CONTROLLED
(B) PROTECTION FROM BRANCH CIRCUIT DEVICES

Fig. 32. Present code rules, under certain conditions, permit the installation of manually started motors rated at 1 hp and less without individual running overcurrent protection when located within sight of the operator. The motors may be installed on branch circuits as large as 25 amperes.

(Photo Courtesy Hagan Electric Co., Little Rock, Ark.)

Utilization of secondhand motors is an important factor in the conservation of materials. In the accompanying article are the War Production Board's recommendations on motor application and operation.

Suggestions for Maximum Use Of Electrical Equipment

EXTENSIVE use of secondhand electric motors and controls, utilization of full service factor of electric equipment, and design simplification are recommended by the electric motors and control section, general industrial equipment branch, of the War Production Board, as aids in conserving critical materials. Operators who have available secondhand motors or who could make effective use of them should write to the electric motors and control section for assistance in locating or placing such equipment.

With the present wartime material allotment to the electric motor and control industry, it is difficult if not impossible to make deliveries on any orders except those for the armed services and most vital war plants, which utilize about 90 per cent of the industry's production. However, use of secondhand standard electric motors and controls—of which there is an ample supply available in dealers' hands and in manufacturing plants, according to the WPB—would effect immediate delivery of these orders.

According to the electric motors and control section, motors today do not break down because of overheating resulting from overloading, but rather because of mechanical failure. Therefore, where new motors and control are required because of their special characteristics, it suggests that all purchasing agents, engineers, architects, and consultants, concerned with the operation, design, or application of electric motors and control, follow out, to the best of their ability, the following recommendations:

Motor Size Recommendations

1. In applying motors, determine with maximum possible accuracy the horsepower required. This should be preferably obtained by test, or, in the event that this is impossible, by accurate calculation, or by careful comparison with known power requirements of similar apparatus.

2. When applying open-type a-c continuous rated 40 degrees Centigrade motors, where the motor rated voltage is maintained, and where the ambient temperature is usually substantially below 40 degrees Centigrade and will only occasionally, or for short periods, equal or slightly exceed 40 degrees Centigrade, select the standard horsepower rating which is not substantially more than 80 per cent of the horsepower determined in accordance with recommendation 1.

Example: The required horsepower, as determined in above, is 9.3; 80 per cent of 9.3 equals 7.44, so select a standard 7.5-horsepower motor.

3. When applying a motor, a-c or d-c rated, on a 50 degrees Centigrade or 55 degrees Centigrade basis, where the motor rated voltage is maintained, and where the ambient temperature is usually substantially below 40 degrees Centigrade and will only occasionally or for short periods equal or slightly exceed 40 degrees Centigrade, select the standard horsepower rating which is not substantially more than 91 per cent of the horsepower determined in accordance with recommendation of paragraph 1, above.

4. After selecting a motor in accordance with recommendations 2 and 3, torque and operating speed should be checked to assure their adequacy.

5. When applying an open-type continuous rated 40 degrees Centigrade d-c motor in a location where the ambient temperature is usually substantially below 40 degrees Centigrade and will only occasionally or for short periods equal or slightly exceed 40 degrees Centigrade, select the standard horsepower rating which is at least 87 per cent of the horsepower determined in accordance with recommendation 1.

Selection of Motor Types

The type of motor selected shall be of the simplest mechanical and electrical design which can be used to accomplish economically the purpose for which the motor is purchased. Where operating conditions permit, the motor should meet these specifications:

1. Open type rather than protected.
2. High speed instead of low speed.
3. Single speed rather than multispeed.
4. Single winding rather than two winding where multispeed motors are essential.
5. Alternating current instead of direct current where a-c power is available.
6. Squirrel cage instead of slip ring.
7. Single voltage only.
8. D-c adjustable-speed motors should have a lesser speed range than formerly.

Selection of Motor Controllers

1. The wiring of all controllers should be specified as following the shortest possible route consistent with the avoidance of electrical and mechanical interferences. This will result in approx-

(Continued on page 56)

Calling All Horsepower!

WPB's urgent request that motors and control be loaded to their capacity limit in order to conserve strategic materials calls for action on the part of industry and electrical equipment manufacturers.

Here are typical savings in materials that can be made through the application of the WPB recommendations:

(1) Thirty-six pounds of vital materials are conserved by using a motor rated at one horsepower, instead of 1½ horsepower, for a 1¼ horsepower load.

(2) Sixty-three pounds of materials are saved by using a motor rated at five horsepower for a 6¼ horsepower load. Ordinarily, a motor rated at 7½ horsepower would be applied to such a job.

(3) Five hundred and fifty pounds of material are saved when a motor rated at 100 horsepower is used for a 125 horsepower maximum load. Usually, a 125-horsepower motor would be ordered.

Electrical Home Maintenance For War-Time Service

A TIMELY HELP for electrical utility companies, appliance manufacturers, and electrical dealers, in the organization of wartime service for electrical home maintenance has been introduced by the National Adequate Wiring Bureau, in the form of a customer education chart that is practical, interesting, and easily understood.

The chart was developed by the Bureau for use in group meetings by home economists and others engaged in helping the public and electrical industry employees to gain a better understanding of home wiring fundamentals and their relation to electrical appliance operation in the home—particularly, in wartime.

The chart consists of 20 individual sheets, each 22 x 34 inches in black and white, and arranged so that they can be hung on a cross-bar or mounted on an easel. Because it presents the wartime wiring story simply and clearly, the chart will be useful to those presenting this subject for the first time as well as to speakers who are familiar with the fundamentals of home wiring.

To supplement the wartime service chart, the Bureau has prepared a suggested script in which the primary consideration has been to make an extremely technical subject as appealing and understandable as possible to the average home maker, who, in wartime, is earnestly seeking information about many things which she has never felt the need to understand before. The suggested text explaining the chart is couched in non-technical terms and avoids detailed discussion of such things as service entrance installations which might vary widely in different locations.

The following paragraphs excerpted from the suggested text indicate the manner in which this material is being used to educate housewives on home wiring fundamentals as they relate to the operation of household appliances in wartime. Miniature reproductions of each page in the customer education chart are shown on the facing page.

These excerpts from the suggested script to accompany the chart indicate the manner in which this material serves to make the housewife conscious of her electrical circuits. The material serves a two-fold purpose: it helps the housewife make better use of her limited electrical system at a time when it cannot be made adequate; and it establishes in her consciousness the need for adequate wiring to be installed after the war.

* * *

"The first step in electrical home maintenance is to learn how needless trouble can be avoided. And that is our first subject. How does electricity reach all the lights and outlets? (Exhibit chart No. 4).

"Electricity enters your home through the meter. From there it is distributed to various parts of the house along the networks—which we call circuits. Your house may have one circuit—or it may have two, or more. These wiring circuits are built into your house—just as the plumbing or the floors are built in. They are a part of your property. They belong to you. And without them, you could not use electric lights or appliances where they are needed. (Exhibit chart No. 5)

"But this is wartime! Copper—rubber—steel—zinc—all the materials that are part of your home wiring system—are needed for making the tools of war. Practically none of these materials can be spared to manufacture electric wire for civilian use. In fact, a war order has been issued by the War Production Board prohibiting the use of electric wiring in homes, except where absolutely necessary. (Exhibit chart No. 6)

"How can you tell when your home wiring system is not functioning properly? You don't need to wait for electric service to stop, in order to know when to check the wiring. For example, if the lights "blink" when you connect appliances, or when the refrigeration starts; if your appliances run more slowly than they should; if you have to wait for the iron to heat up or if it takes forever to make toast; or if you are frequently annoyed by a blown fuse that cuts off electricity from one of your circuits and puts you in the dark; then you are experiencing symptoms that indicate that there may be an overload on your home wiring system.

"You see, wiring can be overloaded when too many lights and appliances are connected to it at one time. The wire in each circuit was made to carry a certain amount of electricity. When it is forced to carry more than that amount, it becomes overheated. If this goes on, year after year, it might eventually cause injury to the rubber insulation. (Exhibit chart No. 7)

"Watchman on the Job"

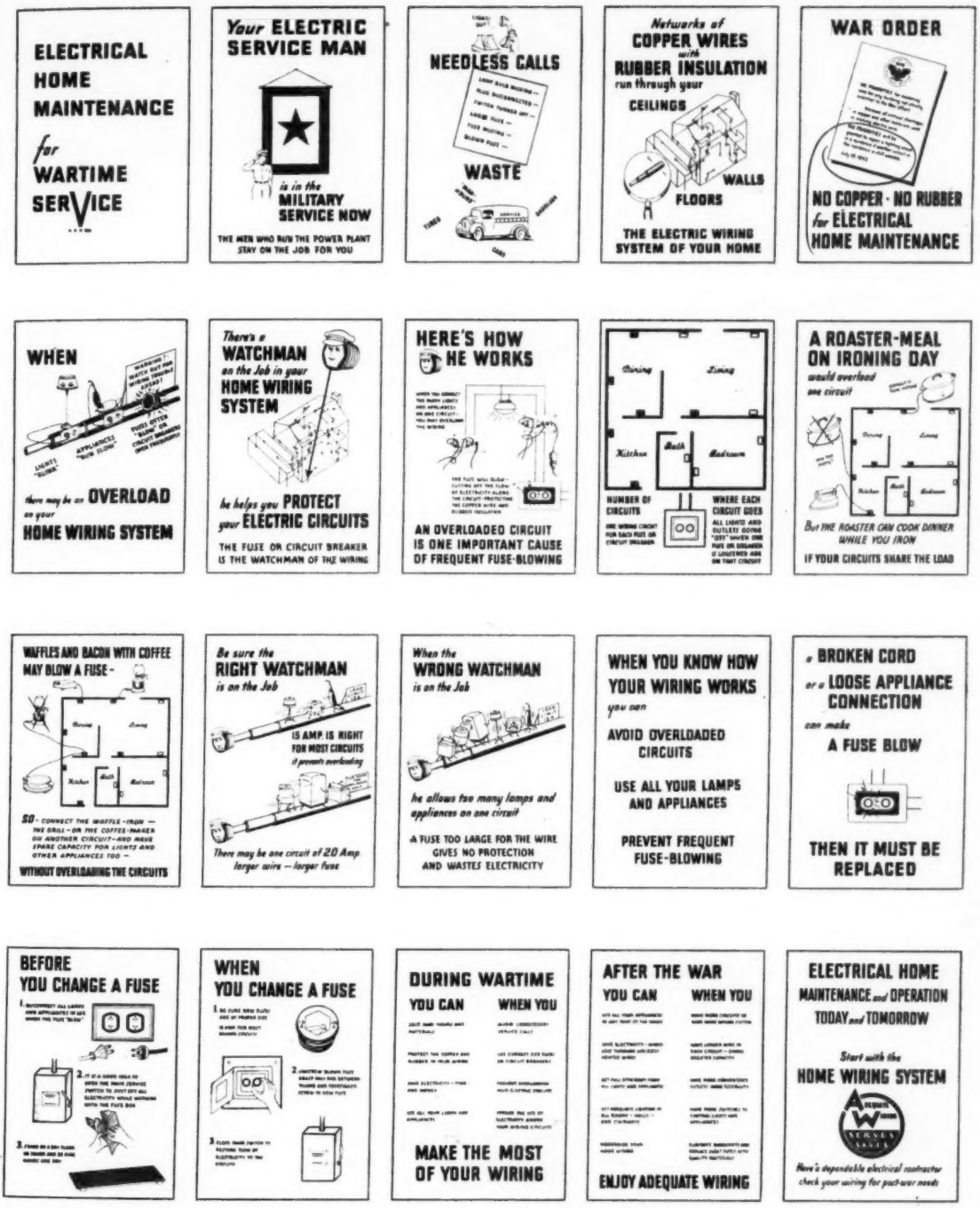
"You do not often hear of a home wiring circuit actually burning out because, as this chart indicates, there is a watchman on the job to protect your electric circuit—the fuse or circuit breaker. You should have seen him many times. Perhaps he has been a source of annoyance, when he turns out your lights in the midst of a party, or cuts off your current when you are busy with the week's washing. But we know you will like him when you know him better. (Exhibit chart No. 8)

"You see, the wire in each circuit is large enough to carry a certain specified amount of electricity, without becoming overheated. It is ample to provide electricity for lighting and a few appliances, all at once. But people who do not understand this, sometimes plug in more appliances than the circuit should carry. That's why you have a watchman in your wiring system!

"It is good to know that the watchman is always on the job—but it is certainly inconvenient for us when he has to do his work—turning out lights and shutting off appliances — always at the moment we need them most. (Exhibit chart No. 9)

"When we learn how to avoid overloading the wiring, we not only do our part toward preventing needless service calls, and protecting our wiring circuits, but we prevent fuse blowing, too. When you know how your wiring system works, you can use all your lamps and appliances and yet avoid overloading the wiring. So get acquainted with the wiring system!

"The first thing is to learn how many electric circuits you have. In this floor plan of a typical home, we have put all the rooms on one floor to make it easier for you to under-


ELECTRICAL HOME MAINTENANCE for WARTIME SERVICE
Your ELECTRIC SERVICE MAN is in the MILITARY SERVICE NOW
THE MEN WHO RUN THE POWER PLANT STAY ON THE JOB FOR YOU
NEEDLESS CALLS
WASTE
Networks of COPPER WIRES with RUBBER INSULATION run through your CEILINGS WALLS FLOORS
THE ELECTRIC WIRING SYSTEM OF YOUR HOME
WAR ORDER
NO COPPER · NO RUBBER for ELECTRICAL HOME MAINTENANCE
WHEN
there may be an OVERLOAD on your HOME WIRING SYSTEM
There's a WATCHMAN on the Job in your HOME WIRING SYSTEM
he helps you PROTECT your ELECTRIC CIRCUITS
THE FUSE OR CIRCUIT BREAKER IS THE WATCHMAN OF THE WIRING
HERE'S HOW THE FUSE WORKS
AN OVERLOADED CIRCUIT IS ONE IMPORTANT CAUSE OF FREQUENT FUSE-BLOWING
NUMBER OF CIRCUITS
WHERE EACH CIRCUIT GOES
A ROASTER-MEAL ON IRONING DAY would overload one circuit
But THE ROASTER CAN COOK DINNER WHILE YOU IRON
IF YOUR CIRCUITS SHARE THE LOAD
WAFFLES AND BACON WITH COFFEE MAY BLOW A FUSE -
SO - CONNECT THE WAFFLE-IRON — THE GRILL - OR THE COFFEE-MAKER ON ANOTHER CIRCUIT - AND HAVE SPARE CAPACITY FOR LIGHTS AND OTHER APPLIANCES TOO -
WITHOUT OVERLOADING THE CIRCUITS
Be sure the RIGHT WATCHMAN is on the Job
IS AMP. IS RIGHT FOR MOST CIRCUITS
There may be one circuit of 20 Amp. larger wire — larger fuse
When the WRONG WATCHMAN is on the Job
he allows too many lamps and appliances on one circuit
A FUSE TOO LARGE FOR THE WIRE GIVES NO PROTECTION AND WASTES ELECTRICITY
WHEN YOU KNOW HOW YOUR WIRING WORKS you can
AVOID OVERLOADED CIRCUITS
USE ALL YOUR LAMPS AND APPLIANCES
PREVENT FREQUENT FUSE-BLOWING
a BROKEN CORD or a LOOSE APPLIANCE CONNECTION can make A FUSE BLOW
THEN IT MUST BE REPLACED
BEFORE YOU CHANGE A FUSE
WHEN YOU CHANGE A FUSE
DURING WARTIME
YOU CAN
WHEN YOU
MAKE THE MOST OF YOUR WIRING
AFTER THE WAR
YOU CAN
WHEN YOU
ENJOY ADEQUATE WIRING
ELECTRICAL HOME MAINTENANCE and OPERATION TODAY and TOMORROW
Start with the HOME WIRING SYSTEM
Here's dependable electrical contractor check your wiring for post-war needs

Miniature reproductions of the National Adequate Wiring Bureau's customer education chart designed to explain war-time electrical home maintenance.

stand. You can tell how many circuits your home has simply by counting the fuses or circuit breakers in the fuse box. There is one wiring circuit for each fuse of circuit breaker in your home.

"In the example we use here, there are two circuits. We then want to know which lights and convenience outlets get their electricity from each circuit. You can't very well follow each circuit from the fuse box because the wiring is inside the walls, the ceilings, and the floors. Getting this information will take a little time, but it's time well spent.

"You will need at least one assistant. Two are better. First, loosen all the branch fuses or flip open the branch circuit breaker switches. This will turn out all the lights in your house. Then tighten up just one fuse or close one circuit breaker and this will send electricity along one circuit and turn on the lights connected to it. In order to be sure you don't

(Continued on page 56)

Mr. "Average" Contractor Faces War-Time Conditions

THAT THE small or medium-size electrical contractor must shift his sights considerably to keep up business volume under today's abnormal conditions is a fact well established. Whether he is to go into government work, remodelling of existing installations, or 100% into repair of electric appliances invariably represents a stiff problem.

Two excellent examples of electrical contractors choosing separate types of "substitute" business for the duration of the war are furnished by the experiences of Stern Electric Company and Pflueger Electric Company, of New Orleans, La. Both are small, efficient contracting firms located within a few blocks of one another and, prior to the Pearl Harbor episode, did the same kind of work. However, each firm is taking up a different field of electrical contracting and has converted its facilities to conform to the new conditions.

Sam Stern, head of Stern Electric, has been a contractor since 1936, specializing in home, commercial, and small industrial wiring contracts during the past five years. He did no radio, armature or sign work, concentrating for the most part on wiring installations and a moderate amount of repair work, particularly on his own installations. Thus typical of contractors "hit hard" by building restrictions and the shortage of wiring supplies, he is going whole-heartedly into the repair and remodelling field, both in wiring and appliances.

"Our business in the past was split about 50-50 between commercial and residential wiring," Mr. Stern pointed out, "but has fallen off to the point where it cannot pay operating expenses. We are not carrying a large stock of materials, and never have, preferring to order from the same houses regularly, and depend on close relations to keep our inventory in shape. I don't think it wise to have a large stock of wiring materials on hand because the government may requisition all of it, anyhow. We are carrying a stock now aimed at small additions and repair, rather than complete installations."

Industrial installations, consisting of anything from the rewiring of a motor to installation of new lighting and "blackout" equipment, are Stern's first answer to the present problem.

Industrial Remodeling Sought

"We discovered early that the house wiring field wasn't sufficient to keep us in business on repairs alone," he said, "although it is important as a supplementary field. We have gone after industrial remodelling and repairs wherever possible, selling the jobs ourselves, and ferreting out potential customers on our own initiative."

Priorities have made most such business difficult to obtain, however, Stern explains. For example, he sold the owner of a New Orleans bag factory on modernization of his existing wiring system; then struggled for several weeks to obtain the necessary priority rating. In another case, a small factory making uniforms for the government was given no better than an A-10 rating. Stern hasn't let these facts discourage him, however; he follows up all small firms which may be handling government work, and need a new motor here or there, new fluorescent light, switches, etc.

Stern spends several hours a day on the telephone calling operators of factories and shops which are either already doing government work or expecting it; and in many cases he has already laid out the electrical improvements before contracts are awarded. "Every contractor ought to put in a certain amount of missionary work on his future customers in this way," he said. "We are getting a lot of business which might go somewhere else as a result."

His second principal interest is industrial remodelling — requiring little parts, priorities or equipment. "We've done more remodelling and addition work already in 1942 than all during 1941," he explains. "Every kind of business is expanding rapidly, and the need for electrical improvements is great. I am 'selling myself' to every such business on the basis that we can accurately design and install remodelling arrangements to meet heavier loads."

Stern visits regularly all New Orleans factories, manufacturing plants and even small shops. He finds it beneficial to reassure worried operators concerning their wiring systems, and to go over them with the owner before any "emergency" arises. About half of his missionary calls in this way have borne results; particularly those where no new wiring has been demanded.

Also in close connection with industrial remodelling, Stern has offered his facilities to builders and civic associations staging a campaign for the remodelling of large old homes into war workers' apartments. These jobs, such as transforming a single house into a duplex, or a two-unit home into four apartments, use little new critical materials, and are expanding swiftly. Stern has developed a colorful sign which goes on all home remodelling projects, indicating that Stern Electric is doing the job, and that it can recommend inexpensive wiring conversion with minimum use of materials for others.

Appliance Service Profitable

Lastly, Stern Electric is now aggressively in the repair field covering small appliances, house wiring, etc. "In the past our repair trade was moderately profitable, but not a major asset," Mr. Stern indicated, "consisting of changing switches, sockets, adding outlets, wiring additional rooms, etc. We had never gone after small appliance repairs. Now both of the above are worthwhile fields, because of larger incomes and desire for more home comfort, and the conviction of most people that their appliances need repairs and maintenance for longer life.

"We formerly 'farmed out' small

appliance repairs which came our way. Since January, we have been doing them ourselves."

Believing that as much as fifty per cent of his future business may consist of appliance repairs, Mr. Stern has equipped his shop with short-circuit testers, grinders, buffer wheel and small-appliance workbench. "We won't take rewinding jobs on fans or motors, but farm these out," he said. "With motors frozen there is plenty of possibilities in motor reconditioning later on." The labor problem —serious in New Orleans—is being solved by training a young man for shop repairs to take the "pressure" off Stern himself. Draft exempt, the new man will enable Stern to keep up his "selling" activities.

Recognizing that service must pay a better return in the next two years, Stern has set his price for outside repair calls at $3 per hour. "On outside calls, we take a little more time to inspect all appliances, and let the customer know she is paying not for a few pieces of metal, but for renewed usefulness of her appliance. Actually, we get more business now at $3 than during 1940, when our rate was $2." Stern is candid in admitting that he does not like repair work—but realizes that in combination with the above specialties, it will keep Stern Electric busy through the war.

The second contractor is Robert Pflueger, Sr., president of Pflueger Electric Company. Like the Stern organization, Pflueger Electric formerly traced most of its profits to house and small commercial wiring, specializing in quick service for builders of projects involving several homes.

When the war program began, Mr. flueger "saw the handwriting on the wall" for regulating homebuilding, and went assiduously into defense-housing wiring work, feeling sure that this would lead to other war work contracts in the future. He had already completed all wiring for the Thomas Street colored and white housing project in central New Orleans—one of the largest built in the South—and with mass-installation experience acquired in this field, he circularized all New Orleans builders likely to go into war worker housing with a folder describing facilities of Pflueger Electric Company, its history, and experience.

"We decided that the war work field, both in housing and commercial or industrial installations, offered the only chance to maintain our organization at anything like its past strength," Mr. Pflueger reports, "and went after it by getting in touch with the proper people and asking for the business."

Pflueger thinks that many contractors make a mistake in waiting for such business to be handed to them. "The war situation makes good merchandising of your services even more important," he emphasizes.

Pflueger Electric Company has been fully engaged in defense work for several months, either on direct government contracts or indirectly through building projects or industry. The company has won a contract for 300 new war worker homes to be started soon; meanwhile, it is operating at peak capacity on other work bearing full priorities.

"We will not touch the remodelling or repair field as long as we can make defense installations," Pflueger says. "We did $80,000 in commercial installations during 1941, a large part of which was indirect defense work, and expect to reach the same figure again this year."

Typical of the business which Pflueger Electric has developed largely through going into the owners' buildings, inspecting systems and making recommendations since early 1941 are a New Orleans linen service company, an $11,000 A-10 job; Swift & Company's large local packing house, $6,000 with an A-10 rating; and Paul Miller Company, a $2,000 job with another A-10 rating. Government agencies such as Maritime Commission, housing authorities, etc., have begun to call on Pflueger for advice—surest indication that his specialization is effective.

Military Projects is this Contractor's Specialty

"WE EXPECT to be in business and have a going concern in the electrical contracting field when the war is over unless the situation becomes much more drastic than it is now." This statement from Chas. M. Mathieu is probably typical of the idea of most electrical dealers and contractors; however, Mathieu is doing more than simply wishing and hoping. He and his associates are working along a definite program to carry on a profitable business for the duration; and they are working along a definite line toward assurance for a good postwar business.

Mr. Mathieu is co-owner with W. G. Poole and F. E. Murray, Jr., of the Mann Electric Company of Houston, Texas. Each of these partners in the business came up via the tool route to an electrical education. All three of them were working for the Mann Electric Company three years ago when they pooled their assets and purchased the company which had been established then for more than ten years. Each of these new owners had been employed in the company for at least one year — and normally since acquiring this business, these partners have run better than $150,000 in contracts annually. At the end of the first five months of 1942, the Mann Electric Company had already exceeded the total volume for 1941 business, and had made as much or even a little better profit than was made for the entire year of 1941. Total volume for 1942 will be very close to one-half million dollars.

"We may be looking at this situation a little differently than a lot of fellows," explains Mr. Mathieu who speaks the sentiments of these three partners. "We all own our homes in Houston and we are rooted here. We expect to stay in business — we like our business and we try to make our customers like us. Although we don't figure any industrial or civilian jobs at all now that don't have a very high preference rating, we are not losing sight of these customers.

"We have finished up a number of civilian jobs in 1942 that were contracted for and the material bought and on hand prior to 'Pearl Harbor.' For example, we finished the high school stadium in Houston with a seating capacity of 22,000, early in July. This stadium is wired for night playing

. . . it is a very modern job with lighting control, press box assembly, and a field house that is one of the finest in the country. This and similar jobs were had when we could purchase material and obtain delivery.

"But today, the picture is different. We turned down one job recently with an A-1-a rating because we couldn't get the material in time to meet the time specified. The job was for Army engineers; but today in figuring any job, the time element is the big factor. We aren't running around figuring every job in the country. The three of us handle all jobs; but we figure the jobs which we know have a high preference rating and for which we are reasonably sure of getting materials. We recently finished a housing project in a war production zone, having 95 units, and the contractors are trying to get an extension of a similar rating for an additional 105 of these houses.

"While we have been doing some industrial plants converting over into war production, we have been taking care of the regular civilian work also. But for the past few weeks, we have steered clear of the civilian work entirely. We now have three large Army camp contracts and we are submitting bids on additional military projects."

War activities have disrupted labor in all fields; however, the owners of the Mann Electric Company are a bit optimistic about this problem. This firm has lost a few men to the military ranks, including the warehouseman. But for the most part, the key men have remained with the organization.

"When the lend-lease program got under way and our first Army camps were being constructed, there were a lot of people claiming to be electricians that were inexperienced," says Chas. Mathieu. "But these men have had some experience now and they have made very good mechanics. The labor situation is very much better than it was even one year ago. And just as these men have learned a lot, we have learned a lot about running jobs with available labor. One of us takes charge of each job — we may have 40 or 50 men on an Army camp, or even more at one time. We carry our key men, but we depend pretty much upon local electricians. And this is a day of specialized work. When we try these men and find them capable of doing a certain job, we try to keep each man busy on a particular type work and he doesn't have to be a good all-around mechanic. He may be a good producer after being shown what and how to do a job, yet he might not be a good all purpose mechanic."

This electrical contractor has some good advice to pass along on the subject of overhead expense: "We have learned that we have to revise our usual figures for overhead. Doing government contracts or sub-contracts for the general contractors on government jobs requires a lot of clerical work, which costs money. We have found that the Navy jobs require about twice as many reports and clerical work as Army jobs, so we have to take all of this into consideration in making our estimates and arriving at a reasonable bid.

Buying Requires More Time

"We find that we must use more time in buying and in contact work, which all adds to the cost of doing business. In other words, we used to estimate a job, get all of the material on a sheet, and then let several supply sources figure the entire project. Today, we don't go by price so much. We take this sheet to the various supply sources and see what each can furnish; and price is not the determining factor. It is the time and assurance of delivery that counts most, for we find that most sub-contracts for government work are pretty rigid as to the time clause and we don't get involved if we can't get the material.

"And as for material, we haven't found much possibility of substitution or of digging around and finding materials that can be used. However, one thing we do is to keep after material. We don't stop just because a jobber or all of the jobbers tell us they don't have material. We keep after them until they get out and rustle up something.

"One thing that has helped us in buying and in running jobs is that any one of the executives can follow right through with the entire job and see it through to the finish. We never lose sight of any phase of the job."

Although civilian jobs insofar as new material is concerned, are practically out for this firm for the duration, these contractors are keeping up their personal contact. Industrial customers are visited and telephoned occasionally. The three members of the firm are all active in the luncheon clubs, etc., and they are keeping up these contacts so that they will be first in the minds of their friends when these friends do need electrical work and the materials can be obtained.

Although the Mann Electric Company does not advertise a repair service, this firm has maintained one fully equipped repair truck for the past several years and is finding this truck to be a real asset during the war emergency. This service truck is subject to call 24 hours a day. It remains in the possession of one man who is getting along in years and finds that he not only does this work well, but he makes more money than any one electrician that works for the company. The man in charge of this truck pretty well operates it as a separate business . . . his name is carried in the telephone directory for service calls, and he gets many calls direct that never come to the company office. He is provided with a book of time tickets and a transfer book. He runs these repair jobs, spending 75 per cent of his time on industrial repairs.

Now when many industrial and business firms can't obtain new material or make additions and electrical improvements, this repair representative for the Mann Electric Company keeps their electrical wiring and equipment in good condition and rendering service for the duration. These regular customers are reminded that this company is interested in their welfare, and that if and when the war is over, this contracting firm will be ready to modernize their lighting, wiring, and equipment.

In commenting upon the service repair, Mr. Mathieu explains, "We make a little money on this repair truck. But the direct profit is small compared with the indirect results, for we have a means of assuring our friends and customers that we are looking out for their interest. We find these people very tolerant — and we believe that when the post war period arrives, these good customers are going to give us first chance at their electrical contracting and modernization work."

Southeast Service Center

With its triple function of supply parts depot, repair station, and warehouse, G-E's "appliance service center" marks Atlanta as the key service city of the Southeast.

IN DOWNTOWN Atlanta, just a few steps from famous Peachtree Street, the General Electric Company has located the latest of its factory operated appliance repair and parts station. The four-story, 20,000-square-foot fireproof building at 49 Auburn Avenue has been the scene of much activity for some months as General Electric's headquarter, field and shop service men and engineers hurried to equip and stock it for an operation capable of filling the war-time needs of the Southeast on a majority of all G-E appliances. Some idea of the size and scope of activities of service center may be grasped from a study of the accompanying photographs.

The Atlanta Appliance Service Center has clearly defined duties to fulfill in the area it serves.

(1) **It is a supply parts depot** for all major and small appliances made by the Company's Appliance and Merchandise Department. As such, it stocks more than 8,000 separate and distinct parts for products which the Department has been making since the early twenties. As will be explained later, the policy on parts sales is not alike for both major and small appliances.

(2) It is a repair station for the entire Southeast for all small traffic and table appliances made by General Electric. These include items such as vacuum cleaners, toasters, roasters, mixers, coffee makers, grills, perculators, clocks, fans, sunlamps, etc.

Repair facilties are open to everyone . . . dealer, distributor, utility, or the household user of the appliance.

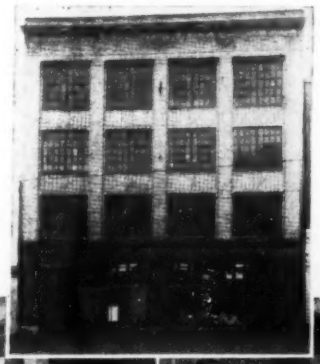
(3) It is a warehouse for refrigerator replacement units.

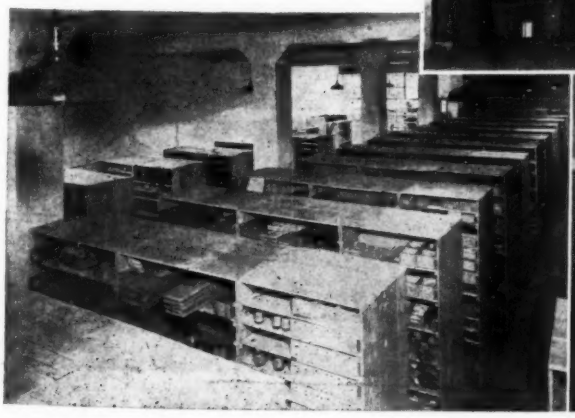
As mentioned previously, the supply of appliance parts from this service center is handled differently on different items. On major appliances (refrigerators, ranges, water heaters, ironers, washers, dryers, dishwashers, disposalls, electric sinks and cabinets), parts are supplied only on order from franchised G-E major appliance distributors. These dirtributors include L. W. Driscoll, Inc., Charlotte, N. C.; Perry-Mann, Inc., Columbia, S. C.; the G-E Factory Distributing Branch, at Tampa, Fla.; W. D. Alexander Co., Atlanta, Ga.; Matthews Electric Supply Co., Birmingham, Ala.; General Electric Supply Corp., Nashville, Tenn.; and, in the case of refrigerator replacement units only, the General Electric Supply Corp., at New Orleans.

On all other supply parts for G-E appliances (vacuum cleaners, toasters, roasters, mixers, coffee makers, perculators, irons, clocks, fans, sunlamps, etc), the Atlanta Appliance Service Center will accept orders from any source.

The service center's repair facilities are limited to small and traffic appliances. No outside servicing crew is maintained and no attempt is made to solicit work in the shop on any appliance that comes in the

Atlanta's new Appliance Service Center, established by General Electric Company to serve the Southeast, occupies the spacious building shown below. At lower left is a small part of the row-upon-row of parts bins. At right, a portion of the office and the service counter.





W. C. Noll, manager of the General Electric Appliance and Merchandise Department's Product Service Division, Bridgeport, Conn.

category of a major item. Most of this service is performed by G-E distributors, dealers, and by cooperating utilities, who are doing a most commendable job of "keeping 'em working."

The service center's third function, that of a refrigerator replacement unit warehouse, is one that extends itself even beyond the states of North and South Carolina, Georgia, Florida, Alabama, Tennessee and Louisiana. Unit shipments are made, as well, into Northeastern Texas, Eastern Arkansas, and Southeastern Missouri. The station has ample space for warehousing as many as 1,500 units and it is expected, eventually, that as many as 150 units a week may leave its loading dock for points around the territory.

Part of a Nation-Wide Plan

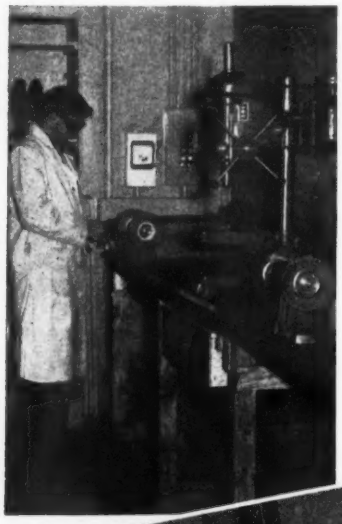
The Atlanta Appliance Service Center is the third in a contemplated group of factory operated stations which General Electric plans to establish. Boston and San Francisco boast the other two already in operation.

According to W. C. Noll, manager of the Appliance and Merchandise Department's Product Service Division, Bridgeport, Conn., every section of the country will eventually be served with these comprehensive and carefully selected stations. Currently, in no less than 50 cities, factory repair and parts service is available on one or more of the 30 million G-E appliances now in use. In the Southeast territory, for example, Tampa has a factory operated Distributing Branch, while clock repair stations will be found in Memphis and Nashville.

The Atlanta service center, in collaboration with the Appliance and Merchandise Department's district office, located in the Red Rock Building, in Atlanta, and the G-E distributors in the area, are appointing servicing dealers throughout the Southeast. To qualify, the dealer must meet ten qualifications that encompass manpower, equipment, reasonable pricing, customer relations, reporting, stocking and promotion.

Personnel of the Service Center

That the service center is in good hands technically and businesswise is indicated by the careers of the four men responsible for its operation. District manager for the territory is J. M. Walker, better known as "Scotty." Shortly after graduation from Ohio Wesleyan University, Mr. Walker joined the Easy Washing Machine Company, of Syracuse, where he was employed until 1926. In that year he became associated with the Appalachian Electric Power Company, of Roanoke, Va., and the following year was appointed sales manager of the R. G. Lockwood Corporation, of the same city. His record attracted General Electric's attention, and on July 1, 1929, "Scotty" affiliated himself with G-E's Refrigeration Section, at Nela Park, Cleveland, as a representative contacting public utilities. From 1929 until 1937, Mr. Walker was district manager, Refrigerator Department, New York City, except for 18 months with the Rex Cole organization in New York City. Since 1937, he has been in charge of the Ap-



Typical views of the service center's repairmen in action showing some of the modern equipment in the service shop.

pliance and Merchandise Department's district office in Atlanta.

Paul Graves, district service supervisor, has been a General Electric employee since 1928, when he joined the Schenectady operation as a student engineer in radio test work. From then until 1931 he did test work for the company in Pittsfield, Mass., and Philadelphia. In 1932, Mr. Graves joined the company's Air Conditioning Department and, in 1937, became field engineer for this Division in Atlanta.

He joined the appliance field force as district service supervisor in October, 1941. In this capacity, he is responsible for both the entire operation of the service center and for all field trade relations in the Southeast relating to service.

Representing General Electric as manager of the warehouse is Martin F. Donohoe, who has long been associated with the electric appliance business. Before joining G-E in 1930, Mr. Donohoe was connected with the National Electric Supply Co., in Washington, D. C. When this distributing organization was sold to General Electric in 1930, "Mike," as he is affectionately known to his many friends and associates, joined G-E's Laundry Equipment Section as field representative. He has been stationed in Atlanta since 1931, and has been affiliated with the new Atlanta Appliance Service Center since April of this year.

Assisting Mr. Graves in his field activities is Fay W. Wheeler, also a General Electric representative of long standing. Prior to 1932, Mr. Wheeler was associated with the Edison General Electric Appliance Company, in Chicago. In that year he joined G-E, serving for a short time in Bridgeport, Conn., before taking an assignment on heating devices in Dallas. Since then, he has been continuously employed in southern territory.

Key men of the Atlanta service center are shown at right center as they look over an electrical heater that has just been repaired. Left to right, J. M. Walker, district manager of General Electric's Appliance and Merchandise Department; Paul Graves, district service supervisor; and M. F. Donohoe, manager of the Atlanta warehouse. Behind them are the shelves of appliances just repaired and ready to be returned to appliance dealers. (Top) Small appliance test bench in service department. (Bottom) The parts inventory covering thousands of home appliance repair parts.

War-Time Conference on Code Problems Well Attended

THE FIRST war-time meeting of the Southern Section, International Association of Electrical Inspectors, was held at Richmond, Virginia, October 19, 20, 21, 1942, in the John Marshall Hotel with one hundred and forty-five members and guests in attendance.

The meeting was officially opened by President W. A. Stall. An invocation by Rev. Charles A. Maddrey, was followed by a brief address of welcome by the Honorable Gordon B. Ambler, Mayor of the City of Richmond, to which E. C. Knox responded.

President W. L. Gaffney of the International Association was then introduced by Section President Stall and addressed the meeting on the war-time duties and responsibilities of electrical inspectors.

No 1943 Code to Be Issued

"The National Electrical Code and its War Program," was discussed by V. H. Tousley, secretary of the International Association. He outlined this subject briefly, describing the formulation of Interim Amendments for emergency conditions by the Emergency Committee of the Electrical Committee and also Interim Amendments as printed in the Emergency Supplement of the Code. The members were informed that the Electrical Committee had decided there would be no 1943 issue of the Code and that future amendments, emergency changes, etc., would probably take the form of supplements.

Several members asked what steps the International Association had taken toward inspection on government reservations, in plants performing work for Army, Navy, etc., and they were informed by Mr. Tousley that offers of inspection services should be made direct to government officials in charge of each specific project. President Stall reported that inspectors from his office had been assigned for several of such inspections.

The secretary read his report and on motion was ordered to take its usual course.

Reports from the secretary of the Southern Section, C. M. Jones, as well as reports from state chapters of North Carolina, Georgia, Louisiana, Mississippi, Texas, Florida and Virginia, indicated continued interest in their work, with somewhat lowered membership, due to members leaving for the armed services or in the other forms of war activities remote from home stations. Several chapters reported active participation in air raid precaution, blackouts, and other civilian defense activities. President Gaffney expressed gratification on reported activities of the various chapters.

"Importance of Electricity in the War Program," was a subject well outlined by E. S. Fitz, general manager, Electric Department of the Virginia Electric & Power Company. Many utility problems in supplying the huge increase in energy demands for greatly expanded manufacturing facilities, as well as requirements incident to concentration areas for various military purposes, together with problems of material and labor supply necessary to effectually meet these demands were discussed.

"War Emergency Specifications and Their Effect on Electrical Work," was discussed by Harvey R. Richardson, of the Specification Branch, Conservation Division, War Production Board, Washington, D. C., who sketched the urgent need for conservation of critical materials and the many savings accomplished through reduction or the use of substitute items. It was stated that the electrical industry was the first to consider and adapt itself to the use of emergency substitutes, many of which have attained such a high performance rating that they will no doubt be retained in our post war system of economy.

"Every crisis is an opportunity," stated M. H. Hedges, chief of the Research Department, International Brotherhood of Electrical Workers, who spoke at some length on the necessity for maintenance of safety standards, especially at this time in the use of substitute materials, and that this crisis was a challenge which labor, together with all other members of the electrical industry, was determined to meet with multiplied production, in safety. He stated that we were in the midst of a "Miracle of Achievement" but warned against stretching this achievement beyond the safety point.

"Interim Amendments and the 1940 Code Supplement," were discussed particularly in this session. Many of the items covered in the supplement were explained by Mr. Tousley, with special reference to emergency insulations for wires and their uses. Attention was directed to the interim amendment permitting 1937 Code capacities for Code grade rubber-covered wires for non-continuous loads, such loads defined as those not exceeding three consecutive hours or six non-consecutive hours at maximum ratings listed. Mention was also made of War Production Board orders requesting 100% loadings for motors and maximum loading of other power equipment.

Increased Equipment Loads

Under the heading "Increased Power Loading," L. F. Adams spoke on the construction of general use type of motors and their ability to handle required demands. It was stated that such motors should now be used, where necessary, up to 125 and 115 per cent respectively, of their load ratings. This can be accomplished without change in wiring or rules, since the Code has required 125% capacities of wires and permitted 125% overcurrent protection for many years, thus using to advantage the adequacy provision now in the Code. Care should be exercised, however, he cautioned, that sufficient starting torque is available for the required loads.

Samples of conductors with new or emergency insulations were distributed and many constructional features described by O. A. Frederickson, of the National Electric Products Corporation, and H. H. Weber, of the United States Rubber Company.

"Plant Production in War Time," was the subject of an address by Lieut. Col. George E. Strong, United States Army, who opened the second day's session. Many phases of the subject were ably described by the speaker and details of plant and personnel features discussed. Many difficulties in adapting peace-time industries to war-time needs, as well as lighting and guarding such properties, were encountered and surmounted through cooperative effort of all parties concerned. Maintenance of safety standards in plant protection was shown to be a part of a necessary requirement by the Army authorities and as such their rules and orders were to be considered as supplementary to Code requirements insofar as military necessities permitted.

The speaker emphasized the need for frequent and continued inspections and the application of preventive, rather than curative, measures with special emphasis on close inspection of details which might be easily affected by sabotage.

M. M. Brandon, of the Underwriters Laboratories, prefaced his remarks on "Substitute Materials and Their Uses," by stating that a very considerable amount of time and labor had been expended in investigations of substitute materials, resulting in sixty-four or more bulletins on the various items. Performance records from field inspections were invited on any of the listings. It was pointed out that substitutes should first be proven necessary to our war-time economy, war in itself not necessarily requiring the use of something different, and that the maintenance of certain safety factors were as necessary in war as they are in peace-time—in many instances, more so, since any features involving failures, which might cause loss of productive manpower may seriously retard the war effort to the extent of affecting many, whereas, in peacetime perhaps only a few would be affected.

Many of the synthetic and substitute insulating materials were discussed as well as conductor substitutes. Attention was directed to the use of steel as conductors and increased sizes or space required in their use because of decrease in conductance to approximately 1/7 of copper values. Attention was also directed to the destructive effects of loading standard lighting panels to 100% of branch circuit capacity. He recommended that only panels designed with bus capacities, etc., for this loading should be used.

Code problems were handled by a "Code Panel" consisting of the following members: Arthur L. Abbott, L. F. Adams, M. M. Brandon, J. G. Fisher, E. C. Knox, Jas. S. Mahan, C. V. Forbes, B. Z. Segall and W. A. Stall. About fifty interesting questions were asked and answered, several of which involved round table discussions and references to many interim amendments as well as the 1940 Code.

New Southern Section IAEI Officers

President: P. L. Muller
1st Vice-Pres.: D. L. Johnson
2nd Vice-Pres.: E. C. Knox
Sec.-Treas.: C. M. Jones

Executive Committeemen:
George Welman L. A. Turnage
J. L. Speights C. I. Johnson
Joseph Whitner

Executive Council
T. W. Bowry C. M. Jones
G. M. Ross

Electrical Committee Members:
N. E. Cannady, Member
J. G. Fisher, Alternate

OCD Lighting Problems

Sky glow and illumination problems related to lighting in coastal areas, were discussed by Roy A. Palmer, reginal illuminating engineer, Office of Civilian Defense, Fourth Service Command. The problems encountered in controlling lighting on coasts, to prevent silhouetting of ships in the shipping lanes produced by sky glow from shore lighting, were fully described and preventive measures outlined by which sea travel might be made safer. Methods of controlling by dimming, obscuring light sources, changing reflecting values of building walls and other surfaces were described in general and regulations covering coastal areas discussed.

James S. Mahan followed Mr. Palmer on the program, discussing "Type S Fuses." Resolutions from the Texas Chapter, protesting against the change of effective date set in 1940 Code, were read and on motion, laid on the table. It was later reopened, and after considerable discussion, and explanation by Jas. S. Mahan, representing the Fustat manufacturers, a motion was passed requesting that the effective date be reinstated.

"Report of State Legislative Activities, 1942," was the subject of an address by G. A. Sawin.

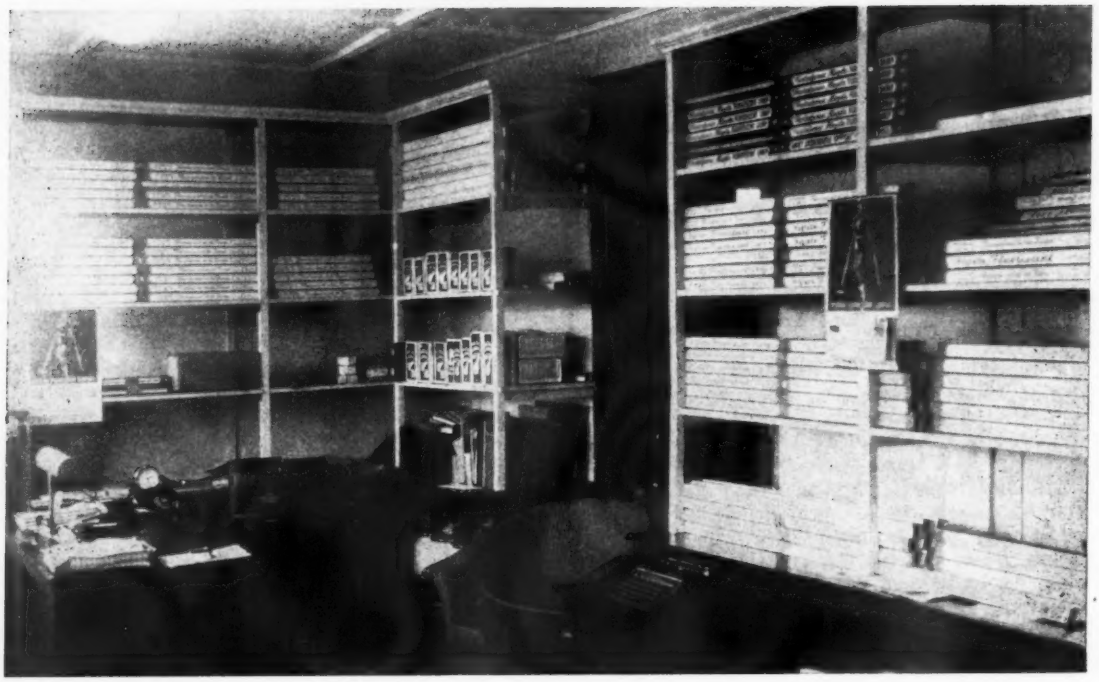
"Porcelain Insulated Wiring Systems," was the topic of a discussion by E. G. Romeiser, who outlined recent developments and plant capacities of porcelain manufacturers.

"Dim-outs As Effected in Florida," was the theme of a talk by Ellis C. Knox, of Miami. "Inspector Transportation" was discussed by several members. They presented their problems in this connection, stating that local ration boards could offer no relief for fuel and tires. A motion was carried requesting the International Association to seek relief from national authorities.

With the use of illustrated slides, Jos. Siddall, of the H. H. Robertson Company, demonstrated "Q-floor" construction and discussed the advantages and the savings effected by the use of cellular steel floors.

"War Training Sparked by Electrical Apprenticeship" — on this timely subject, the meeting was addressed by Wm. F. Patterson, executive secretary, Federal Committee on Apprenticeship, Department of Labor, Washington, D. C. The subject was timely due to the serious situations caused by the shortages of skilled workmen brought about by the need of such men in the armed forces.

The following officers were elected at the closing session: president, P. L. Muller; first vice-president, D. L. Johnson; second vice-president, E. C. Knox, and secretary-treasurer, C. M. Jones. Executive Committee: Geo. Welman, J. L. Speights, Jos. Whitner, L. A. Turnage, C. I. Johnson. Electrical Committee: member, N. E. Cannady; alternate, J. G. Fisher. Executive Council: T. W. Bowry, 3 years; C. M. Jones, 2 years; G. M. Ross, 1 year.



Lamp Replacement Market An Opportunity for Dealers

QUICK to realize the possibilities of the fluorescent lamp replacement market as a means of helping the electrical dealer and contractor over the difficult period ahead, John B. Galvin, Jr., and his brother James, aggressive proprietors of the Lighting Engineers Company, Norfolk, Va., are now reaping the benefits of a well-planned program that has been energetically promoted.

Early in 1942, the Galvin brothers decided that a definite program, backed by real work, would crack this growing market. They opened their new store at the intersection of Twenty-second Street and Colley Avenue, in Norfolk, in March, and devoted all of their efforts to the promotion of the fluorescent lamp and starter replacement business combined with lighting fixture servicing.

A real success story is to be found in the progress their firm enjoyed in its first few months of existence. Although they started their business on a small scale, they found it necessary to buy a truck at the end of the first month of business, so rapidly had their volume grown.

The fluorescent lamp business alone in the first four months totaled $1,300 while fluorescent fixture sales in the month of May amounted to $4,300. Lighting fixture service work has also increased rapidly with as many as 100 fixtures being serviced per day.

This successful establishment of a fluorescent lamp sales and service headquarters was the result principally of careful planning backed by hard work. In the words of John Galvin, "We knew we had to fully back our program to make it 100% successful. A program like this, plus plenty of support, will pay dividends any time."

A review of their program indicates how carefully they planned their promotion so that not a

A corner of the Lighting Engineers Company's display room with its neat stocks of lamps is shown above. At left, typical advertising of the firm in the local newspapers.

single possibility would be overlooked. First of all, they maintained a definite schedule of at least two hours each day for making contacts and soliciting fluorescent lamp replacement business. Further, they kept their store open in the evening, they made good use of newspaper advertising, they maintained special listings in the telephone book as well as advertisements in the classified section, and, of special importance, they maintained an up-to-the-minute display in their neat well-lighted store.

Protection for Motor Circuits

(*Continued from page 11*)

motor to be damaged because of a stalled rotor. The Code gives as an example of this type of unit, a motor operated domestic oil burner equipped with safety combustion controls. These are tested under stalled rotor conditions to determine whether or not the motor will be damaged by overheating in the period required for the combustion controls to disconnect the motor from the supply system. The Code provides that such units must indicate on their nameplates that this type of control protective equipment is being used.

The present rules for the running overcurrent protection for all manually started motors rated at 1 hp and less have been greatly criticized. The present section permits, under certain conditions, the installation of such motors, *if within sight of the operator*, without individual running overcurrent protection. (See Fig. 32.) Furthermore, the motors may be installed on branch circuits as large as 25 amperes. For small fractional horsepower motors this size fuse offers no protection whatsoever from overloads on the motor. Of course, the theory is that as long as the motor is within sight of the operator, he may visually inspect the motor and disconnect it if it does not run normally.

The Code Article Committees have recommended changes which would limit such installations to circuits rated at 125 volts or less, and 20 amperes maximum. The general rule permitting the running overcurrent protection to have a maximum rating shown for the branch circuit protection, Columns 7, 8, 9 and 10, Table 20, of the National Electric Code, 1940 Edition, is still recommended. Thus, a ¼ hp, single-phase, 220-volt motor requires 2.4 amperes full load current. Table 22.) Referring to column 1 of Table 20, for 2 or 3 amperes the maximum size branch circuit fuse allowed (column 7) is 15 amperes. Even with this new rule it is believed that some individual protection should be provided. It is a very simple matter in many instances to provide a "Fustron" or some similar device on each individual motor.

If the motor is not within sight of the operator, then running overcurrent protection must be provided, as discussed above, for ⅛ to 1 hp automatically started motors, (see Fig. 31), such as overcurrent protection for 140% of full load current rating, or high reactance wound or integral protective device, or in the form of safety controls, etc.

As previously mentioned, motors rated above 1 hp must in general have their running overcurrent devices rated at 125% or less of the full load current rating of the motor, (see Fig. 33), Thus, a 25 hp, 440-volt, three phase motor has a full load current rating of 32 amperes (Table 24). The maximum size of the running overcurrent device may be: 1.25 x 32 = 40 amperes. Referring to column 5 of Table 20, in the Code, it will be noted that a 40-ampere fuse is shown and column 6 shows that the maximum setting of the circuit breaker is also 40 amperes.

The present Code rule, however, permits up to 140% rating for the protective device for a refrigeration motor rated at 5 hp or less. These motors in ratings from 1 to 5 hp, inclusive, when installed with refrigeration units, will draw a slightly heavier starting current and will also overload periodically for short periods of time.

The Article Committee now recommends the deletion of this 140% rule and offers as a substitute a two part rule outlining the methods to be used in obtaining the running overcurrent protection for motors rated above 1 hp:

(1) The use of a separate overcurrent device which is responsive to the motor current. Thus, a simple fuse or circuit breaker rated at 125% of the full load current rating of the motor would suffice.

(2) To take care of the refrigeration motor problem, the device may be a unit mounted within the motor. This protective unit may be responsive to the motor current only or may be operated by both the motor current and motor windings temperature. (Similar to a Thermoguard.) The device, however, must:

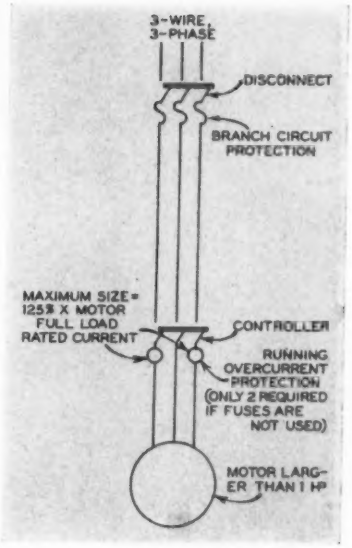

3-WIRE, 3-PHASE
DISCONNECT
BRANCH CIRCUIT PROTECTION
MAXIMUM SIZE = 125% X MOTOR FULL LOAD RATED CURRENT
CONTROLLER
RUNNING OVERCURRENT PROTECTION (ONLY 2 REQUIRED IF FUSES ARE NOT USED)
MOTOR LARGER THAN 1 HP

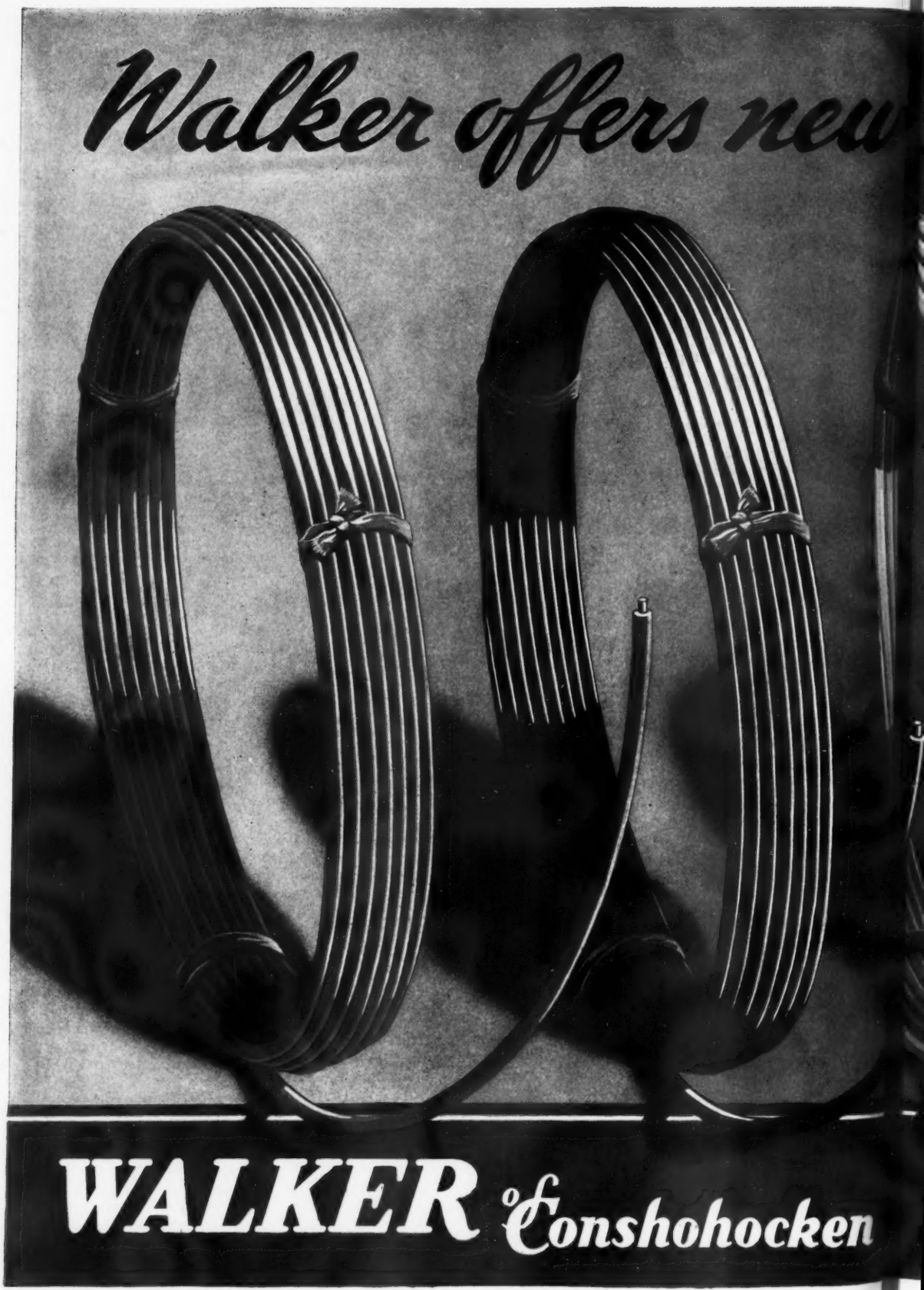
Fig. 33. Motors rated above 1 hp must, in general, have their running overcurrent devices rated at 125% or less of the full load current rating of the motor. The present Code rules, however, permit up to 140% rating for the protective device for a refrigerator motor rated at 5 hp or less.

(a) be approved for use with the particular motor it protects;

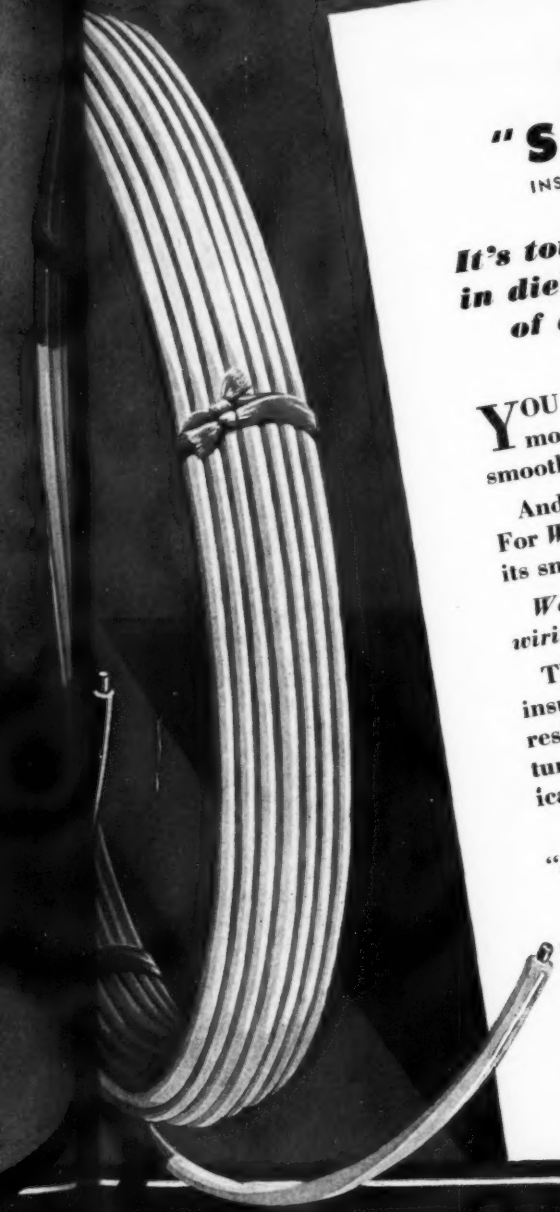
(b) prevent both the motor and its individual branch circuit conductors from overheat caused by the motor being overloaded or failing to start; and

(c) disconnect the motor from the line under prolonged overloads equal to 125 per cent of the full load current rating of the motor in an ambient temperature (average room temperature) of 40° C (104° F).

This interrupting device, if not an integral part of the motor but actuated by a protective device which is mounted integrally with the motor, must be arranged to disconnect the motor from the line when the control circuit opens. Thus a "Thermoguard" may have its contacts connected in the operating coil circuit of a magnetic contactor serving the motor. When the "Thermoguard" contacts open, the operating coil is deenergized and the magnetic contactor opens disconnecting the motor from the line.


Walker offers new
WALKER of Conshohocken

...w synthetic covered wire



WALKER "SYNTHETIC"

INSULATED WITH THERMO-PLASTIC RESINS

It's tough! It's flexible! It's high in dielectric strength! And—best of all!—It's easy to handle!

YOU are sure to like *Walker* "*Synthetic*" the moment you see it and feel it. It's so clean and smooth and glossy! So bright and colorful!

And you'll like it even better when you use it. For *Walker* "*Synthetic*" *strips freely* and—due to its smooth, slick surface—it *pulls easily.*

Walker "*Synthetic*" *can save you time on every wiring job!*

There are other outstanding advantages. The insulation is tough and long-aging. It is unusually resistant to heat, oils, alkalies, acids, and moisture. And it has high dielectric and high mechanical strength.

And so we say: Next time—use *Walker* "*Synthetic*". It will help you do a better job!

* * * * *

Walker "*Synthetic*" may be had in all standard colors—black, white, red, blue, yellow, green—and in practically any other shade desired. What's more—these colors won't scuff off!

Sizes range from small diameter building wires up to large circular mil. cables. (18 gauge to 500,000 circular mils.)

Write for prices or talk with one of our field representatives. Walker Bros., Conshohocken, Pa.

ELECTRICAL DISTRIBUTION
Engineering and Operation

Conservation Suggestions For Distribution Engineers

CONSERVATION of scarce materials, and the substitutions and changes in practice required to meet war-time conditions, were among the topics given particular emphasis at a recent meeting of the Engineering and Operation Section of the Southeastern Electric Exchange, in Atlanta, Georgia.

Some of the high lights of papers relating to the subjects of conservation, salvage and substitutions are reproduced in the following paragraphs.

(The following paragraphs are excerpted from a paper presented by L. M. Smith, electrical engineer, Alabama Power Co., Birmingham.)

Design and Construction

The substitution of timber "A" frame structure in a new double-circuit 110 kv line for which plans had already been made to use galvanized steel.

The use of treated timber for substation structures, foundations, pull-box covers and fence posts.

The fabrication of new steel structures from used galvanized steel retired from various jobs.

The use of painted black steel for small structure in place of galvanized steel.

The use of concrete pedestals where practical instead of galvanized steel.

A reduction in the weight of steel substation structures by welding instead of bolting.

The simplification of certain steel column footing designs by the elimination of plate and angle assemblies.

The use of steel bolts in place of copper alloy bolts in low voltage switchgear.

The use of bare copper cable for low voltage buses instead of tubing or bar.

The use of control cable laid directly in the ground in place of lead-covered cable installed in conduit.

The use of single conductor cable, as needed, in place of multi-conductor cable.

A reduction of the insulation thickness in cables to conserve rubber or other insulating materials.

The use of "Danger—High Voltage" signs made of painted masonite.

Substitutions from savings in line hardware, insulators and other items.

The use of steel wire for short, lightly-loaded primary extensions.

The hand-serving of low voltage connections and of light anchor guys to reduce the use of clamps.

The use of wood slug anchors for guys on distribution lines.

The omission of primary arresters, or the relocation of near-by arresters when new installations of distribution transformers of the conventional type are made in the vicinity of existing transformers.

The use of galvanized steel pipe instead of copper for power transformer and circuit breaker oil lines.

The use of steel piping in place of Admiralty metal in new steam plant feed-water heaters.

The use of cast iron terminal connection boxes instead of aluminum boxes in outdoor substations.

The use of special fiber flashing in place of copper for building spandrels and roofing.

The use of masonite instead of sheet steel for the cover and walls of outdoor breaker cabinets.

The removal of two composite steel and aluminum overhead ground wires on 74 miles of 110 kv line to permit its use as conductors on a new 110 kv line.

The operation of distribution transformers serving residential loads at 150% rating on peaks instead of 135%.

A change in type of multiple street lamp being used, resulting in longer life and a corresponding saving in car travel for replacements.

Operation and Maintenance

The replacing of only the phase wire on services where the weatherproof covering has fallen off, leaving the bare neutral in place.

The use of one bare wire on services to housing projects to conserve weatherproof wire.

The use of wood mallets instead of steel sledge hammers for dislodging coal from railroad cars, and ashes from ash cars.

The repairing of worn pump and crank shafts by welding on new material and re-machining.

The repairing of small bronze sleeve bearings, which wear unevenly, by babbiting the worn portion and by rotating the sleeve to bring new bronze into position.

The repairing of large bronze sleeve bearings, where wear is uniform by boring out the bearings to take bushings or by tinning and lining with babbitt.

The use of rubber hose for bushings on pins in flexible couplings of governor pressure pumps.

The making of air compressor belts by cutting good sections out of old and larger belts.

The rebabbitting of stoker line shaft bearings with babbitt made up of scrap lead from old control and power cables.

The making of intricate equipment parts by hand from scrap pile parts, where impossible to buy or where delivery of new parts is unsatisfactory.

The repairing of parts of equipment removed from service years ago because worn or broken and their re-use for emergency service.

The more frequent inspection of generating plant equipment to detect parts that could be replaced or repaired before failure.

The keeping of a complete record of all idle or partially loaded circuits, transformers and other equipment for possible use in an emergency.

Warehouse and Shops

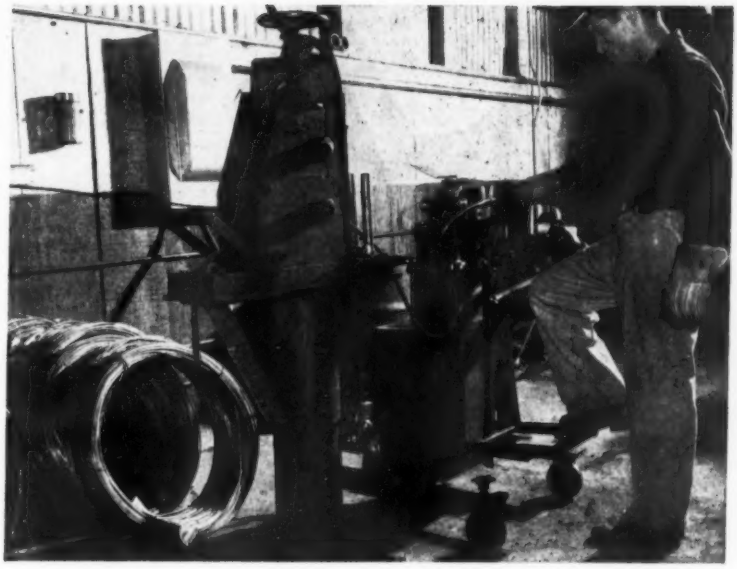
The reworking and redesigning of old hook-stick and gang-operated switches, oil circuit breakers and other equipment for re-use in new construction.

The removal of insulation from old soft-drawn weather-proof wire for use as tie wire in place of purchased tie wire.

The re-use of jewels from meters and instruments after inspection, cleaning and re-mounting.

The manufacture of new relay contacts from salvage materials.

The repair and replacement of broken parts of meters, relays and instruments with bronze, bakelite or steel.



This butt welder is used to join together pieces of copper wire removed from our distribution system. Welds are made in a fraction of a second using no other materials than the wire itself. During the past years over 60,000 pounds of copper wire, which would have been sold as scrap, has been reclaimed and put back into service. Notice the large rolls of reclaimed wire to the left of the machine.

The use of trains and buses wherever practicable to conserve tires on Company automobiles.

The resetting of governors on passenger automobiles from 50 miles per hour to 40 miles per hour.

The equalizing of the mileage use of utility passenger cars by a careful control of assignments.

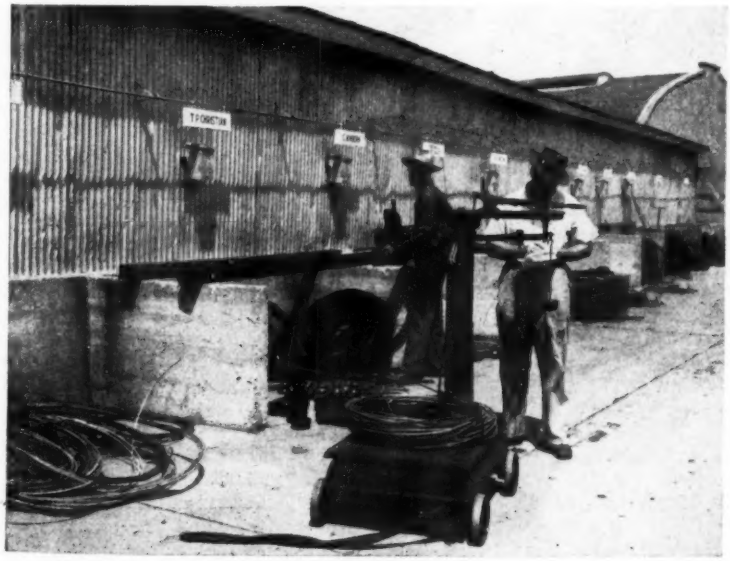
The checking of the air pressure in tires before each trip from the central garage.

The switching of tires on cars more frequently to equalize the wear.

A weekly inspection of the steering mechanism, brakes, tires and lights of line trucks.

The removal of rubber mats from truck compartments as an aid to the national salvage program.

The rebuilding of automobile engines, transmissions and other parts, for an indefinite period of service.



Each day line crews in the Electric-Distribution Division carefully gather materials and parts removed from service. At the end of the day, these materials are placed in bins where they are checked and divided into classes for proper disposition.

(The following paragraphs are excerpted from a paper presented by R. N. Dowling, director of purchases and stores, New Orleans Public Service, Inc.)

In our company the salvage division of the Purchasing and Stores Department has been placed in charge of all salvage operations and has been charged with the responsibility to see that all scrap materials are sold or reclaimed as soon as possible.

Some suggested methods for the successful operation of a salvage division are as follows:

1. Devise a plan to keep the importance of reclaiming materials before the employees and keep

them informed of the importance of conservation.

2. Speed up the return of scrap and waste materials through existing channels to the salvage division.

3. Utilize all critical materials to the very best advantage.

4. Seek the cooperation of all operating superintendents and foremen in this work.

5. Salvage all abandoned and obsoleted equipment.

6. Provide receptacles for the collection of scrap at all locations where scrap is accumulated.

Our salvage department is always on the alert for new methods and ideas for salvaging materials that are not now being salvaged.

One of the fundamental principles of successful reclamation is the identification and segregation of all materials. Mixed scrap can only be sold at the lowest grade.

Scrap Metals. All scrap metals are collected, separated as to grade, and stored for a period of not more than thirty days. All sales of scrap materials are made to authorized scrap dealers.

Bare and Weatherproof Wire. In August 1941, we introduced the butt-welding process into our salvage system. Since that time, we have salvaged for re-use over 45,000 pounds of copper wire which ordinarily would have been sold for scrap. Pieces of wire as short as ten feet are welded and the resulting splice is a better job than the hand or sleeve splice since no soldering is necessary, no additional wire is used to make the splice, and the diameter of the wire remains the same, thus making storage and handling much easier.

Guy Wire (Copperweld and Galvanized.) All guy wires in lengths in excess of fifteen feet, with good protective coats, are saved. These pieces are used in making tails for guying. Longer lengths are spliced together and made into standard coils. At present we are experimenting with sleeves to be used in the reclamation of guy strand.

Pipe (Iron and Brass). The damaged part of a length of pipe is cut off with a power driven saw, and the usable portion is rethreaded. If the piece is too short for regular use it is cut into various length nipples. We also cut special lengths for the operating departments. Bent pipe is straightened by the use of a small hydraulic press.

Fibre Conduit. The damaged part of the conduit is sawed off with a hand saw, and a new joint is made by using the Conduit Lathe. We also cut special lengths for jobs. Time required to cut a joint is approximately two minutes.

Iron Conduit. This pipe is handled in the same manner as iron and brass pipe except in cases where it is long enongh it is made into standard lengths by the use of sleeves or welding.

Lead Splicing Sleeves. The compound filling caps are salvaged from old cable joints. New lead sleeving is cut into sleeve lengths and the caps are reused in making new splicing sleeves.

Copper Lugs and Sleeves. By using a pair of Thermo electric pliers the solder is melted from copper lugs into a container. The solder is then melted into bars for re-use. This method is very satisfactory since not only is it very fast but it leaves the lugs properly tinned, thereby eliminating tinning when they are again used.

Metering Switches. The porcelain blocks are removed and repaired. The cabinets are repaired and repainted. Where the identification plate is missing, or the cabinet is used for other purposes, the identification tag is corrected with an electric marker.

Meter Boxes and Boards. This material is made of wood, and in most cases have to be repainted. If holes have been bored, or some part is deteriorated, the necessary repairs are made.

Secondary Racks and Pole Switches. Broken insulators are replaced. If the insulator is chipped slightly, it is repaired by using shellac and varnish. The iron parts of these items are repainted with a metal paint.

Pole Line Hardware. Nuts are removed by a special nut removing machine made in our shop. This machine will remove one or more nuts at the same time. It removes nuts at the rate of 1" per second. The threads are inspected, and, if found to be crushed they are straightened by use of a special die that can be clamped on the threads at any point. The bolts are then cleaned by buffing, and nuts are run down on the bolts with the same machine described above.

Braces are straightened and painted with a special metal paint.

Ground rods are straightened and the solder is melted off by submerging in a special electric solder pot. This solder is poured into moulds and re-used.

Miscellaneous iron hardware, in most cases, are cleaned either by buffing or soaking in cleaning tanks using a special cleaning compound.

Insulators, (Wood and Porcelain). The porcelain insulators are cleaned by washing in a special cleaning compound. If insulators are chipped slightly they are re-varnished. Wood insulators are also cleaned and re-varnished. Missing or broken parts of strain insulators are replaced.

Scrap Copper Wire. Insulation is burned from wire in an open yard, where control of smoke is not necessary. Wire is assorted as to grade and stored accordingly. A portion of this scrap is made into insulator tie wires.

Scrap Lead Covered Cable. The lead sheath and insulation is burned from the copper in one operation. The lead goes into a pot, where it is poured into pigs. The copper is then assorted as to grade.

Street Lamps. These are repaired by hand, in most cases requiring new glass, gaskets, sockets, and wire leads.

Cross Arms. After all hardware has been stripped, if reusable, they are creosoted by brush application.

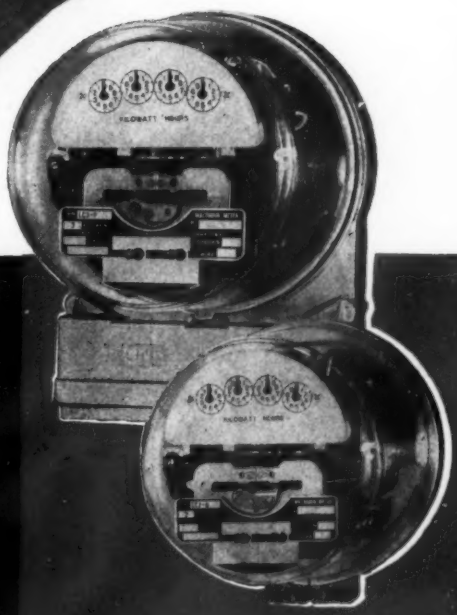
Iron Poles. The damaged portion is cut out by use of motor driven hand saw and a new piece is welded back with an electric welding machine.

Miscellaneous Items. There are also a number of other miscellaneous items that are reconditioned in our salvage shop. We make periodic visits to other shops in our company to see if additional materials can be salvaged. We do not limit our activities to the field of salvage only. Our shop is fitted for wood work, metal work, welding, electrical and other activities. We also are able to manufacture certain items for stock, and do many repair jobs for the operating departments. Some of these activities consist of making street light standards from old standards and scrap pipe; making meter boxes, meter boards, cable sleeves, record boxes, and various other items.

WAR BONDS M.
UNCLE SAM M(
POWER-*full*

"On Measurement is founded the whole progress of man.."

Wouldn't amusement change to amazement if this should happen o you? Suppose, as you were coming from church on a Sunday morn-ng, someone should pull you aside and align you with fifteen other nen so that all left feet were in line, one behind the other. Then, when e was all through, he would announce with great dignity: "This is he right and lawful rood (rod) with which I shall survey your land." hat happened in Germany in the 16th century. This was the concep-on of standardization. Compare it with today's high standard of easurement of electricity set and met by the electric utilities and ie manufacturers of watthour meters.



NO OTHER COMMODITY IS MEASURED SO *Accurately* AS ELECTRIC POWER

SANGAMO ELECTRIC COMPANY SPRINGFIELD ILLINOIS

AKE
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Save time in planning

WESTINGHOUSE

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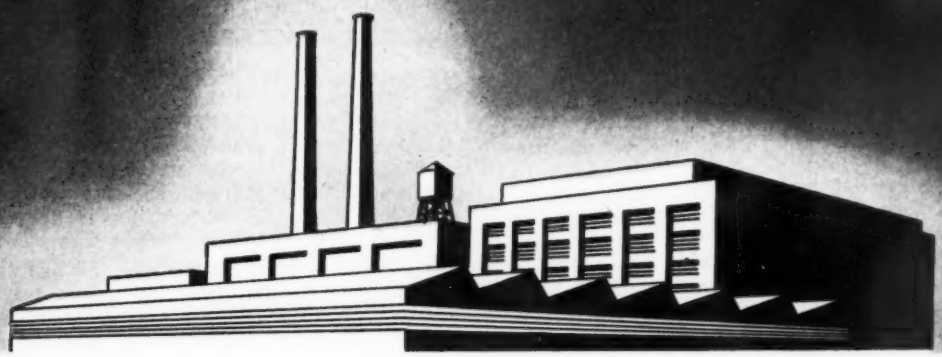


CHOOSE THE SYSTEM THAT "FITS" THE PLANT

Building tanks . . . planes . . . ships . . . guns?

Is it a small plant . . . a large one?

What are your service requirements?

It makes no difference what size, shape, or type of plant it is. From the available distribution systems for which Westinghouse builds apparatus, you will find one that will serve efficiently and economically.

There is no universal distribution system that can serve all types of industries. The important job is to select the system that "fits" the plant.

Westinghouse can supply equipment for all types of power distribution systems, including the new Plant Network System now installed in approximately 40 large war factories.

All systems recommended by Westinghouse are designed for use with standard distribution equipment. There will be no time lost in building special apparatus.

Write today for the Westinghouse book B-3152, which briefly describes a group of different plant distribution systems. It points out the advantages of each system and will save time in helping you determine the best one for your plant. Or, if yours is a rush job, call our local office and ask one of our engineers to call and discuss your problem. You'll get immediate co-operation. Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

PLANT DISTRIBUTION SYSTEMS

PRACTICAL HELPS for the TRADE

Contractor - Dealer - Motor Shop

Concentrated Control Conserves Man-Power

Even in "essential" industry manpower is becoming increasingly hard to get. Well-planned electrical control of plant machinery can conserve it.

At a mill producing dairy and poultry feeds in Miami, Fla., a panel recently installed by the Ingalls Electric Company of that city enables the feed firm's milling superintendent to control all plant mechanism without leaving a limited area.

The Hector Supply Company's mill has a ground coverage of 150 feet by 150 feet. In addition, there is a "pent house" and a basement. Mechanical installations are located in all three portions of the building. Moreover, electrical powering motivates all of the mill's machinery.

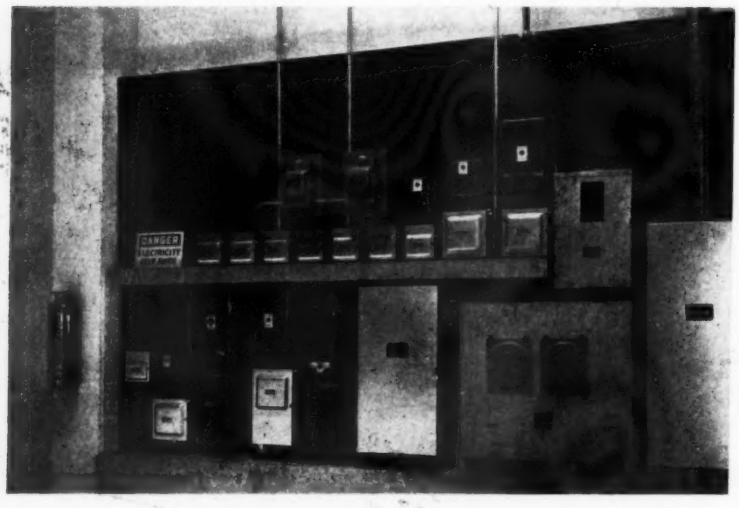
The plant supplies its customers with unmixed feeds in several sizes and grades, and mixed products, molasses-sprayed and plain. The entire output, regardless of type, is delivered automatically to the bags in which it goes to final consumers. During the processing, grain goes from the main floor to the basement, is elevated to the pent house and descends to the ground floor again.

The various units, comprising the complex mechanism which does the job, are powered separately by electric motors of various horsepower ratings. They include a 25-hp motor which drives two batch-mixers of 2-tons capacity each, a 3-hp motor powering a bucket elevator, one of 15-hp and one of 1½-hp which power two separate units in the molasses-mixing mechanism, and four others powering a hammer mill, a corn cutter, an oat crimper, and a separator-grader. These motors are of 60 hp, 15 hp, 5 hp, and 7½ hp, respectively.

The main point of supervision over the various milling operations is at the mixing units on the ground floor. Not over 15 feet from the mixers is located a panelboard which controls all electrical installations, except the motor which powers the hammer mill. This latter motor is controlled directly at its location.

Thus, for example, if the milling superintendent wishes to start the grader-separator in the pent house or the molasses pumps in the basement, he has only a distance of 15 to 30 feet he must travel in order to throw the necessary switch.

Incidentally, this plant's arrangement, powering and electrical control are considered by milling authorities to be outstanding for the type of operations performed. The details for the electrical controls were worked out by Ingalls Electric Company and Fred Snodgrass, the feed company's milling superintendent.



This panelboard provides centralized control for all motors in a modern "assembly line" feed producing mill.

Explanation of Code Amendments

Emergency conditions resulting from the war effort have led to the adoption of a number of Interim Amendments to the 1940 Edition of the National Electrical Code. Most of these amendments have been published in the form of a supplement to the 1940 Code and are now available. The Electrical Committee of the National Fire Protection Association has decided not to issue a 1943 revised edition of the Code but will keep the 1940 edition in effect, modified by these interim amendments.

In this and following issues of ELECTRICAL SOUTH, the most important amendments will be reproduced together with a brief explanation telling why each amendment was adopted and what its effect will be on wiring installations, etc. These explanations are *not* official interpretations but have been prepared especially for readers of this magazine by various members of the International Association of Electrical Inspectors, most of them members of the "Article Committee" concerned and men who played an important part in the preparation of the amendments which they explain.

(A copy of the 1940 Code and the Supplement will be mailed

promptly upon receipt of 15c. Address orders to this magazine, Grant Building, Atlanta, Ga.)

Interim Amendment No. 47

***Section 3342. Use. Interim Amendment No. 47. Approved May 7, 1942.**

Amend the first sentence of section 3342 to read: "Armored cable (types AC *and ACV*) may be used for both exposed and concealed work in dry locations, etc."

This amendment revises section 3342 of the 1940 Code, so that for the duration of the emergency varnished-cloth wires can be used in place of rubber-covered wires in armored cable. Such varnished-cloth or varnished-cambric conductors are expected to have the same flame-retardant treatment on the individual conductor fibrous covering as was called for on rubber-covered wires intended for armored cable use. This was indicated by a corresponding change in paragraph "a" of section 93341 to specifically mention varnished-cambric conductors as well as rubber-covered conductors.

At the time this amendment was adopted, it was thought that this change would be an aid in the conservation of rubber, but since it was adopted the manufacture of armored cable has been prohibited by the War Production Board so the change has turned out to be of little practical significance.

Closely related to the acceptance of varnished-cambric conductors in regular armored cable is the amendment in section 93341 recognizing what is essentially a varnished-cloth cable with an interlocking metal armor made from metal strip both thinner and wider than standard armored cable, and properly classified as a special form of varnished-cloth cable rather than an armored cable. This emergency change is covered by Interim Amendment No. 68 which reads:

"For the duration of the war, armored cable of No. 4 and larger, for 600 volts or less, installed as exposed work in industrial locations, may have a metal armor strip of the thickness now approved under section 7111 of the 1940 National Electrical Code for armored cable for more than 600 volts."

Similar varnished-cloth cable for high-voltage work has previously been recognized in section 7111 and listed by Underwriters' Laboratories, Inc., under the heading of "Varnished-Cloth Wires" and the type designation ACV. It is uncertain whether the order stopping the production of armored cable applies likewise to this material.

Further discussions of Interim Amendments to 1940 National Electrical Code will appear in following issues.

Interim Amendment No. 43

***Section 3372. With Uninsulated Conductor. (New section). Interim Amendment No. 43. Approved April 9, 1942.**

Add a new section 3372 to be effective only for the duration of the emergency.

3372. With Uninsulated Conductor. Non-metallic sheathed cable, having one circuit conductor without individual insulation but assembled with an insulated conductor or conductors beneath an over-all fibrous covering, may be used in defense emergency buildings of occupancies other than listed in 1 to 7 in section 3362. Such cable shall not be used on circuits exceeding 208 volts to ground, nor for circuits beyond the final cable branch-circuit outlet, such as non-metallic surface extensions or fixture wiring, nor for extensions to existing branch circuits on which all conductors have individual insulation. The uninsulated conductor shall be used only as a grounded circuit conductor. Distribution cabinets from which branch circuits are run, if of conducting material, shall be bonded to the grounded circuit conductor. Junction boxes, outlet boxes, covers and switch and receptacle plates on branch circuits shall be of non-conductive material approved for the purpose.

This amendment recognizes for the duration of the emergency a nonmetallic-sheathed cable having one circuit conductor without individual insulation. It is a form of construction not previously considered acceptable although a somewhat similar form of construction has been recognized for trial installation under a resolution of the NFPA Electrical Committee. The trial installation cable, frequently referred to as "CNX," differs in construction from the nonmetallic-sheathed cable recognized by Interim Amendment No. 43 in that the nonmetallic-sheathed cable is a sturdier construction, having two fibrous coverings between the uninsulated neutral conductor and the live conductors. The trial installation cable usually has only one fibrous covering between the neutral conductor and the insulation on the other conductors. Also, it is usual practice in the trial installation cable to have the uninsulated neutral conductor made of individual strands twisted around the insulated conductors, while in the nonmetallic-sheathed cable recognized by Interim Amendment No. 43 it is the general practice to use a solid conductor in the smaller sizes and run it parallel with the other conductors, thereby using less copper.

It should be noted that this special form of nonmetallic-sheathed cable having one circuit conductor without individual insulation is limited as to voltage and types of buildings. It is also recognized only for use with non-metallic boxes in the branch circuits. It was primarily intended to conserve rubber in those types of buildings that had to be erected despite the rigid limitations on both copper and rubber during the emergency.

There is some doubt as to what constitutes defense emergency building, and that is a point that may need further clarification if the special material is used to any great extent.

Wringer Service Saves Rollers

J. L. Tanner, proprietor of the Appliance Service Company, Miami, Fla., has found a way to save vital rubber, and—in some cases—to restore to usefulness washing machine wringers which otherwise might not be replaceable.

Wringer rolls, otherwise unreplaceable, have been restored to service by turning down in a lathe.

Rubber rollers on old wringers have a habit of becoming worn, and squeezed out of true. Tanner puts them, one at a time, into a metal-cutting turret lathe, and pares them down to the point at which they will make a proper "bearing" when replaced in the wringer.

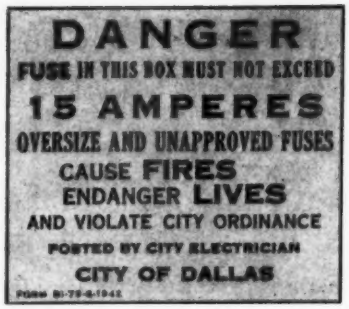
The operation seldom calls for the removal of more than 3/8-inch of the rubber, and often not over 1/4-inch.

After a roller has been trued up, and while it still is in the lathe,

with a wood rasp Tanner evens up and puts a rounded "bevel" on each end. When completed, the rollers have a "crepe" finish which gives them a better-than-new grip on any article to be wrung.

On washers of some manufactures, Tanner explains, he can obtain replacement rollers. On others there is no local source of supply. By turning down rollers, when new ones are not available, he frequently can keep in service a wringer which otherwise might be useless to its owner. The roller shown in the photograph is from a 7-year-old washer of "non-standard" manufacture.

If rollers are brought to his shop, Tanner charges $1.00 each for turning them down. Otherwise, he adds a service charge of at least $1.50—more, if the traveled distance warrants it.



The above message in the form of a sticker 2½-inches square has been used advantageously by the electrical inspection department of the City of Dallas, Texas. C. P. Ragsdale, chief inspector, designed the sticker. The plan is to put these stickers on as many fuse cabinets as possible. This can be done by electrical inspectors, contractors, fire department inspectors, etc.

War-Time Responsibilities Of Electrical Inspectors

"Electrical inspectors have more work to perform during the war," writes George Welman, electrical engineer for the Louisiana Rating & Fire Prevention Bureau, New Orleans. "They should make a study of active electrical fire and accident hazards. The inspectors must be able to point out the electrical defects and also explain to the user why the defect may cause a fire or accident. Simplicity and economy are primary requisites at this time. There should not be an ounce of material used that can be saved. Essential materials for munitions, armaments and transports should not be insisted upon by electrical inspectors for wiring where such materials are not absolutely needed to safeguard against the fire hazard or prevent electrical accidents and casualties.

"The electrical inspector knows the difference between an active hazard and a technical violation, the latter not being immediately measurable as a hazard. To distinguish between hazards and technicalities is an essential qualification of an inspector. Standards are being changed during the war as the exigency demands such a change. For instance it is advocated that triple braid, weather-proof wire be used for open wiring inside buildings or as the grounded conductor in a raceway. The reason for the change is to save rubber used for insulation. Triple braid, weather-proof wire has a fairly satisfactory insulation when dry. I have actually held two such conductors insulated with triple braid, weather-proof insulation when carrying 2300 volts.

"There is one serious objection to ordinary triple braid line wire for inside work in that the insulation is very flammable. The filler used to saturate the braids when heated gives off a gas and burns as freely as rubber compound. Fires have been readily carried from one part of a building to another by the burning insulation. It was some time before the Electrical Committee was convinced that flame retardent treatment was needed for the braid on rubber covered wire. Now that weather-proof line wire will be used for inside work, the outer braid should be treated with something to make it flame-proof at least to the extent that the braid on rubber insulated wire is flame-proofed.

"An item that is unsafe to use is the non-approved plug fuse. There are a lot of non-approved plug fuses on the market. Tests made in the past with unlabelled plug fuses showed that these fuses were not calibrated correctly. A 15-ampere unlisted fuse would carry as much as 35 amperes before it would blow. The effectiveness in any fuse depends on correct calibration and incidentally calibrating the element is a factor in the cost of making a fuse.

"It's the wrong idea that anything should go during the war. Fires and accidents at home may dangerously hinder supplies reaching our Army. The electrical inspector will be kept very busy, to see that wiring installations are kept reasonably safe. The inspector should make frequent reinspections of manufacturing and storage risks. Our experience shows that inadequately wired buildings necessitate much temporary electrical construction with overloading of feeders and bridging of fuses with copper wire. Temporary work can be made reasonably safe and it is the job of the inspector to see that it is made safe. Any possible loose connection or short circuits may cause a fire. When fuses are bridged in overloaded cutouts the wires themselves may actually get hot enough to melt the copper when a short circuit occurs.

"The occupancy of a building has much to do with its classification as a safe or unsafe fire risk. Electrical work that would create no appreciable hazard in an iron foundry might be extremely dangerous in places where readily ignitable materials are stored."

New Electrical Books

Alternating-Current Machines—Second Edition

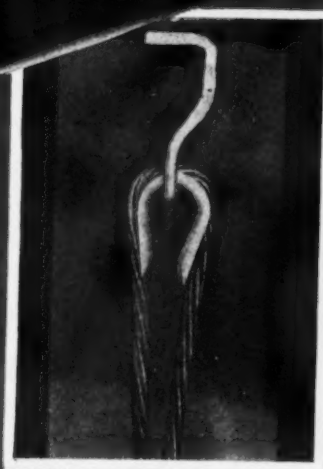
By A. F. Puchstein and T. C. Lloyd. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York, N. Y. 655 pages, illustrated. Price, $5.50.

One of the outstanding features of this comprehensive text-book for electrical engineering students is the bibliography and suggestions for further reading and investigation that accompany every chapter. The reference includes not only books but also technical magazines and association transactions.

The book is divided into ten sections covering the following subjects: synchronous generators, transformers, polyphase induction motors, single-phase induction motors, synchronous motors, alternators in parallel, synchronous converters, mercury-vapor rectifiers, series motors, and repulsion motors. Each of these subjects has been treated in the following order: construction, discussion of operating characteristics, calculation of operating characteristics from tests, and discussions and analysis of various related phenomena.

The book includes 366 diagrams and illustrations and 27 tables. It makes considerable use of mathematics and diagrams. An appendix includes 175 problems arranged in the order in which related material is presented in the text.

The Phantom Lineman

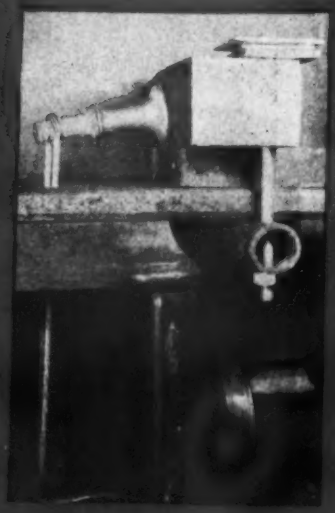


Wherever your power or communication system may serve; whatever its hazards may be and whether your crew is made up of one or hundreds of workers, the Phantom Lineman is also there working for you. He is on the pole, hard at work while your men are eating lunch and he is there when they are off duty recuperating for the next day's labor.

He is revealed for the first time by the accompanying photos showing how only a few of many hundreds of tests are carried out to insure the highest possible quality in Hubbard Pole Line Hardware.

For the Phantom Lineman is none other than old man "Test", the fellow who puts his finger on the bugs in a product. He is the one who checks the stresses, strengthens the weak spots, trys the practicability of the item and then stands by while it is in service on your lines.

He notes with satisfaction that his work has enabled your service to hold up through a severe winter storm, spring sleet or burning desert heat. He is the phantom who started his work in the Hubbard test laboratory and continues, shoulder to shoulder with your linemen.



"HANG THE LOAD ON HUBBARD HARDWARE"

HUBBARD AND COMPANY

PITTSBURGH . . . OAKLAND CALIFORNIA . . . CHICAGO

IMPROVED

Skilled hands depend almost entirely on eyes for guidance. That's why hands work faster and produce more with greater accuracy and safety when quality lamps make seeing easier. To make sure you get the utmost in lamp economy — brightness, long life, low cost—look for the "Westinghouse Mazda" trade mark on the lamps you buy.

It's WESTINGHOUSE *for better light at lower cost*

in all 3!

1. Brightness

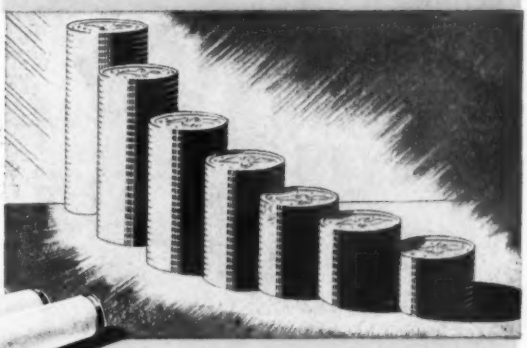
Through intensive research ever since fluorescent lamps were first introduced, Westinghouse has increased lamp brightness. This more-light-for-your-money advantage has been accomplished in many ways, for example: by making fluorescent powders which glow more brilliantly; by rigidly controlling thickness of the powder coating; by making lamps stay bright from end to end.

2. Long Life

Today's Westinghouse Mazda Fluorescent Lamps have a rated average of 2500 hours, or 1000 hours longer than the fluorescent lamps of four years ago. Westinghouse research achieved this advantage by many new developments, including improved electrode design; better control of gas pressure inside the lamp; and by perfecting the method and machines which insert the mercury into the lamp.

3. Low Cost

While many Westinghouse technicians were improving lamp quality, others were developing highly accurate mass production machinery to reduce lamp prices. As a result, Westinghouse Mazda Fluorescent Lamps are precision built to the most exacting limits, and now sell at the lowest prices in history. A 40-Watt Westinghouse lamp that formerly listed for $2.80 now lists for only 95 cents!



Westinghouse
MAZDA LAMPS

Wedges Used to Obtain Tight Soldered Joints

*By A. C. Roe**

When rewinding or repairing a-c windings, rotor or stator, lap or wave windings, that have large copper conductors and require large figure eight connecting clips to join the leads together, it is difficult to obtain tight soldered joints unless the sides of the clips, or riser necks, are forced tight against the sides of the coil leads.

A simple method employing hard wood wedges can be used as shown in Fig. 1, while Fig. 2 shows the procedure used to calculate the wedge tapers, length, etc. The depth "G" of the wedge should extend from the top of the clip, or riser neck, to at least one-half inch below the clip, as shown in Figs. 1 and 2. The length "L" of the wedge should be 1/8-inch longer than the clip. The width "W_1" and "W_2" at the bottom and top of the wedge, can be calculated as indicated in Fig. 2 or can be measured direct from the winding. The top of the wedge should come flush with the top of the clip, or riser neck, so that the soldering copper can be used without touching the wood wedges.

In Fig. 2, "R_3" equals the outside radius of the clips or riser neck, "R_2" the radius at bottom of clip, and "R_1" the radius selected to make the depth "G" of the wedge the required dimension. "C_1" and "C_2" or the chords of the angle "P" at radius "R_1" and "R_3". Then "W_1" and "W_2" equals "C_1" and "C_2" minus the thickness "T" of the coil lead and both sides of the clip or riser neck.

For rotors, a full set of wedges should be cut, then apply temporary bands to clip at riser neck end of rotor so as to form a solid foundation and prevent shifting of coil ends. Next start a wood wedge between each clip and riser neck, as shown at right of Fig. 1, and drive wedges about one-third way down. Then drive every other wedge down to the final position, as in Fig. 1. Drive down the rest of the wedges lining up the clips and coil leads, etc. This will produce a solid structure and force all clips or neck sides tight against the coil leads.

After soldering the clips, the rotor can be put in a lathe and excess coil leads cut off and ends lined up; or a temporary band can be run on over the clips or riser necks, the excess coil leads projecting beyond clips trimmed off, and then clips soldered after first removing band from over the clips and wedges.

On a-c stator windings only about 12 to 24 wedges need be used as the wedges can be removed after soldering the clips and then moved ahead. With this method it is advisable to leave about 3 to 6 clips soldered and wedged at each move.

Thus a few hard wood wedges will help conserve solder, as with a tight joint only a minimum of solder is needed. The resulting joint is not only tight, but its resistance is low. This is important in view of the fact that the conductivity of most solders is only 15 to 25 per cent of that of copper. Therefore with the leads, clips, and riser necks re-tinned with a thin film of solder, and with a tightly wedged joint, it is possible to prepare a good joint.

In these times when motors are required to produce maximum ratings, all soldered joints must be well made. It will be found advisable to keep all soldering irons and coppers clean and hot. Don't try to make too many joints with one iron. Flux all joints well.

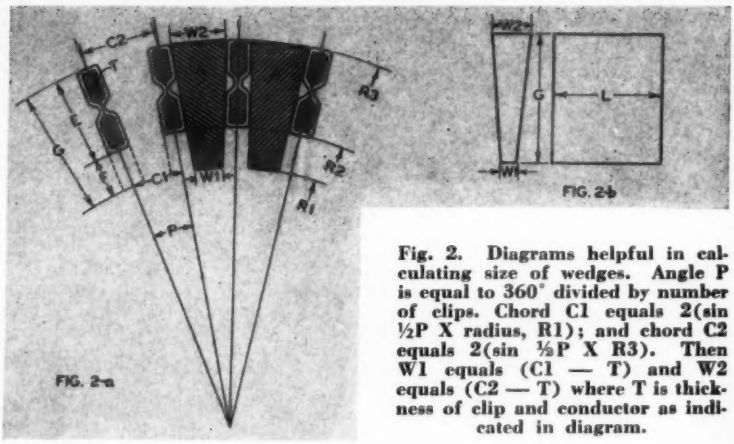


Fig. 2. Diagrams helpful in calculating size of wedges. Angle P is equal to 360° divided by number of clips. Chord C1 equals 2(sin ½P X radius, R1); and chord C2 equals 2(sin ½P X R3). Then W1 equals (C1 — T) and W2 equals (C2 — T) where T is thickness of clip and conductor as indicated in diagram.

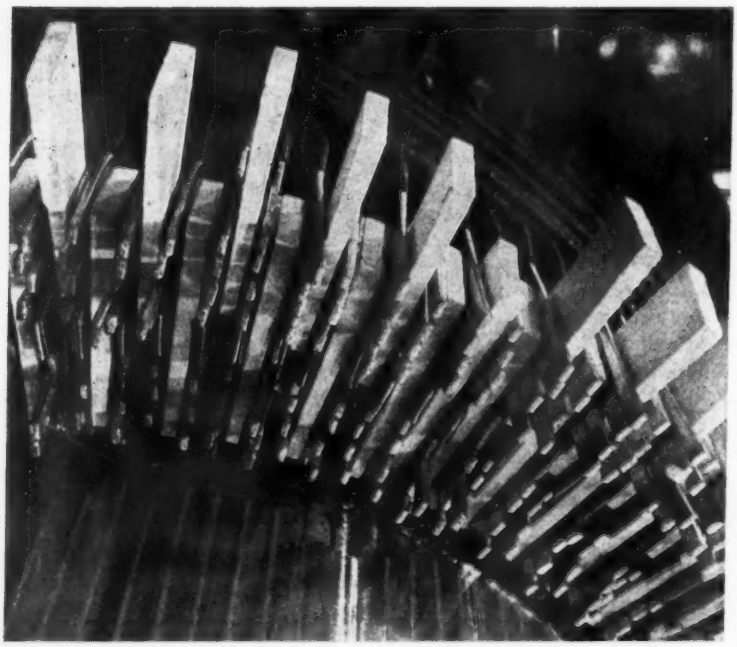


Fig. 1 Hard wood (maple) wedges insure tightly soldered joints.

*Motor engineer, Westinghouse Electric and Manufacturing Company.

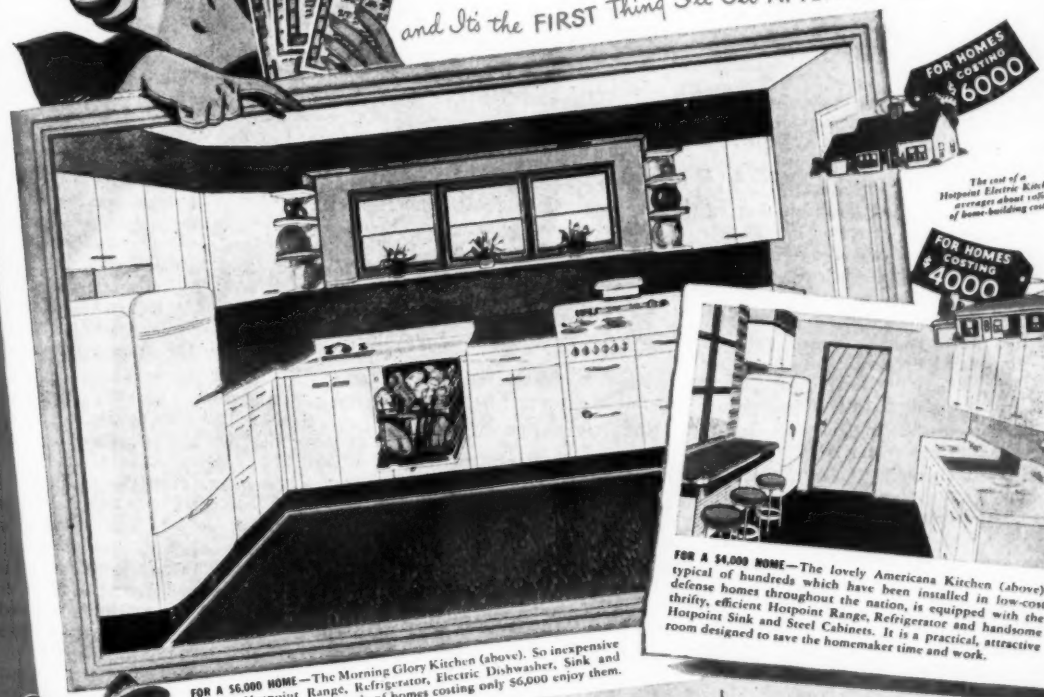
OTPOINT'S WARTIME ADVERTISING PROGRAM

Gets a Big Hand!

My War Bond Savings Will Buy a HOTPOINT ELECTRIC KITCHEN Like This

THE OTHER DAY at Red Cross a new light dawned when one of the girls told me how surprisingly little she paid for *her* Hotpoint Electric Kitchen. Why, the money we are saving every month by investing in War Bonds will buy that Electric Kitchen after Hotpoint finishes its war job and starts making home appliances again. And believe me, I can hardly wait . . . In my new kitchen all my work will be like play!

and It's the FIRST Thing I'll Get AFTER the War!


FOR HOMES COSTING $6000
The cost of a Hotpoint Electric Kitchen averages about 10% of home-building costs.
FOR HOMES COSTING $4000

FOR A $6,000 HOME—The Morning Glory Kitchen (above). So inexpensive are the Hotpoint Range, Refrigerator, Electric Dishwasher, Sink and Steel Cabinets that thousands of homes costing only $6,000 enjoy them.

FOR A $4,000 HOME—The lovely Americana Kitchen (above), typical of hundreds which have been installed in low-cost defense homes throughout the nation, is equipped with the thrifty, efficient Hotpoint Range, Refrigerator and handsome Hotpoint Sink and Steel Cabinets. It is a practical, attractive room designed to save the homemaker time and work.

Buy War Bonds Today—Electric Kitchens Tomorrow!

Hotpoint

ELECTRIC KITCHENS

EDISON GENERAL ELECTRIC APPLIANCE CO., INC., 5676 W. TAYLOR ST., CHICAGO, ILL.

ANOTHER HOTPOINT ADVERTISEMENT

Meeting With Huge Success

WATCH for Hotpoint's War Bond advertising in *Life, Collier's, Saturday Evening Post, American Home, Better Homes and Gardens, House Beautiful* and *Bride's Magazine.* Officials of the Treasury Department have commended Hotpoint's program for adding incentive to the purchase and holding of War Bonds.

Leading utility companies, department stores and large retailers throughout the country are sponsoring the Hotpoint War Bond theme locally. Ask your Hotpoint distributor for details. Edison General Electric Appliance Co., Inc., 5614 W. Taylor St., Chicago.

NEWS of the INDUSTRY
National and Southern

Sales Executives Meet in Birmingham

Wartime subjects of particular interest to sales executives of southeastern electric utility companies featured the three-day conference of the Southeastern Electric Exchange held in Birmingham, Alabama, October 15, 16 and 17.

The first day of the meeting was devoted to separate conferences for the industrial power group and the combined residential and commercial group.

Under the chairmanship of P. D. Lawrence, director of commercial and industrial sales, Virginia Electric & Power Company, the industrial power conference included a discussion of such subjects as "Conversion of Industrial Plants to Produce Essential War Products," "Electric Service to Government," "Maintaining Contact and Relations with Present Industrial Customers," "Maintaining Personnel Organization Present and Planning for Post War," "New or Additional Electric Service to Non-Government Customers to Use for Duration Only," and "Limitation Order L-94."

J. S. Sutherland, sales promotion manager, Alabama Power Company, presided over the residential and commercial conference. Particular attention was given to the discussion of ways and means of keeping home appliances in operation. Among the subjects discussed were: "Repair Work and Servicing by the Utility During the Emergency," "Dealer Repair and Service Program Sponsored by Utility," "What Is Being Done by Manufacturers to Assure A Continuous Supply of Repair Parts," "The Part Home Service Can Play in Promoting the Preservation and Maintenance of Home Appliances," "Maintaining Residential Revenues During the Emergency," "Improving Commercial Lighting Conditions, and Rendering Service and Maintenance on Existing Commercial Equipment," "Commercial Clinics," "Nutritional Programs For Use of Home Makers," and "Fluorescent Lighting."

At the general conference on October 16 and 17, O. M. Jackson, deputy regional director, WPB, Atlanta, discussed the conversion of existing plants to war production. Others who addressed the first session of the conference were C. L. Osterberger, general sales manager, Louisiana Power & Light Company, who discussed electric service on the farm; Roger Bolin, advertising manager of the Westinghouse Merchandising Division, who discussed nutritional programs for industrial workers; and Roy A. Palmer, merchandise manager of Duke Power Company, who described dim-out procedure for coastal areas.

The afternoon session of the general conference included a discussion by C. A. Collier, vice-president, Georgia Power Company, on the conversion of sales promotion activities for better utilization of energy, customers' equipment, and continuance of proper customer relations. He was followed on the program by Carl Snyder, manager, General Electric Appliance and Merchandise Department, and W. E. Parrott, director sales, Ebasco Services, Incorporated, who discussed post war markets.

Westinghouse Merchandising Division Gets New Name

The "merchandising" division of the Westinghouse Electric and Manufacturing Company has been renamed the "Electric Appliance" division, it has been announced by J. H. Ashbaugh, manager.

The change has been made because the new name better indicates the manufacturing facilities at both the Mansfield, Ohio, and Springfield, Mass., plants. Producing only for war now, the new name of the division quickly suggests the type of manufacturing facilities available. When the war is over and peacetime production is resumed, the newly adopted name will again more specifically suggest the kind of business we are in—that of building electrical appliances to meet future needs.

J. H. Ashbaugh

There are already some visible guideposts which will likely influence the design features of the electrical home appliances of the future, according to Mr. Ashbaugh.

Probably domestic refrigerators for the future will be vastly different because the food shortage requirements will have changed. Already the war, due to transportation limitations, has promoted the development of new forms of food. Dehydrated, concentrated, and frozen foods will play an increasingly important role in the domestic habits of the postwar era. These changes in food forms indicate that refrigerators of tomorrow will necessarily provide faster freezing and enlarged capacity for frozen storage.

Typifying appliance design of the future is the Westinghouse automatic electric washer, the Laundromat. This product, which was introduced to a limited market just before the outbreak of the war, handles a complete washing process automatically. Clothes are placed in the machine, soap is added, and the dial is set. The rest is done by the washer—water is mixed to the correct temperature, clothes are washed and rinsed in a succession of automatic cycles and finally dried in a spinning cycle. At the end of the process the machine shuts itself off. This fully automatic machine sets a pace for future designs for similar electrical appliances.

Developed uses of plastics and aluminum have been accelerated recently due to war demands and while there is a shortage of each now, they will most certainly be plentiful after the war and are bound to influence the designs of the future.

Just before this country was plunged into war, Westinghouse sponsored some vital research on the effect of cooking methods on the vitamin content of food, he explained. These tests conducted by an independent research laboratory, indicated substantial differences in vitamin retention of vegetables cooked by two methods—one, termed the

old-fashioned or commonly accepted practice, and the other labeled "vitamized" or protective cooking. This research has proved that if scientific rules for cooking are followed more vitamins will be retained in the food. Knowledge gained from this food research will give us a definite pattern of proper cooking methods of control that accomplish these nutritious cooking principles with the fewest possible variables. This indicates the further development of automatic control features.

The results of this food research on vegetable cooking is not standing idle now. It is one of the important scientific sources on which the Health for Victory Club—a war plant nutrition program—was established. This club, which was developed by our home economics department, was started here for the benefit of the women who cook for Westinghouse plant workers. Because the objective of this Health for Victory Club, to improve the health level of employes and reduce absenteeism is so vital to this country's war effort, the program has now been offered to all war plants. There are now nearly 200 war plants scattered throughout the country who are carrying on this industrial nutrition activity.

"MKB Communique" Makes Its Bow!

During the seven years of its existence, The Modern Kitchen Bureau has offered many helps for utilities and their dealers, but none it is believed will be more timely, or of greater potential value than the new "MKB Communique," a 16-page publication to be issued from time to time. The Bureau is sponsored jointly by the Edison Electric Institute and the National Electrical Manufacturers Association.

Now that the war has put the damper on the "sell" in electric appliance advertising, companies have been casting about for a single phrase or idea that sums up the situation for electric kitchen appliances. The Modern Kitchen Bureau seems to have put its finger on a "natural" in the phrase, "Lucky me! I'm an American!"

The first issue of the Communique shows how this stirring theme puts patriotism back of the logical urge to save now and buy later. The Bureau explains that words without end have cautioned consumers to guard against mechanical mishaps, and that a remarkably good job is already being done on the sub'ects of vitaminized diets, balanced menus and wartime meals.

The Bureau goes on to say: "The need . . . is for an advertising theme that anticipates the future and provides for the present—a theme that appeals through logic to common

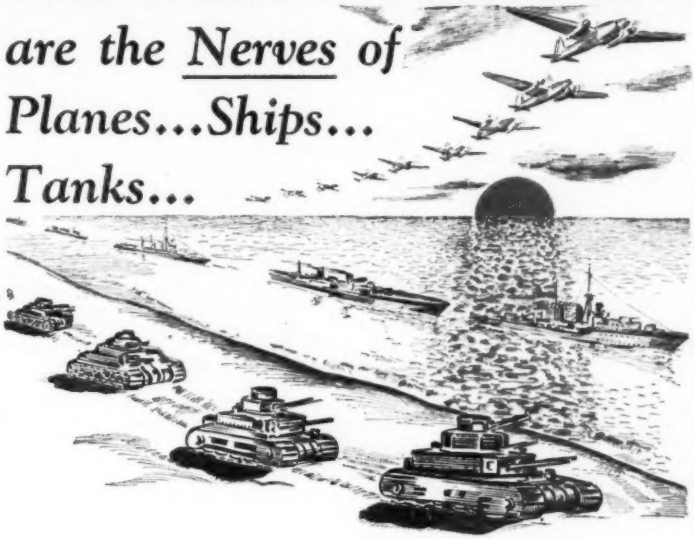
RUBBER COVERED POWER CABLES • BUILDING WIRE

CRESFLEX NON-METALLIC SHEATHED CABLE • SERVICE ENTRANCE CABLE • MAGNET WIRE • BARE WIRE

VARNISHED CAMBRIC • FLEXIBLE CORDS • LEAD-ENCASED AND PARKWAY CABLES • ARMORED CABLE

ELECTRICAL CONDUCTORS

are the Nerves of Planes...Ships... Tanks...



and CRESCENT INSULATED WIRE & CABLE CO. is doing its part in furnishing a vast quantity of electrical wires and cables that carry the power from battery or generator to delicate parts that control these instruments of destruction. Telephones, radios, lights, signals, starters and instrument control are all dependent on electrical conductors that *must not fail.*

CRESCENT has had over fifty years experience in the manufacture of ALL types of Electrical Wires and Cables.

100% War Production

CRESCENT INSULATED WIRE & CABLE CO.

Ask Your Wholesaler for

CRESCENT WIRE and CABLE

Factory: TRENTON, N. J.—*Stocks in Principal Cities*

SOUTHERN REPRESENTATIVES

ATLANTA, GA.	NEW ORLEANS, LA.	DALLAS, TEXAS
Edgar E. Dawes	Paul Hogan, Jr.	Huie-Simmer Co.
A-4 Rhodes Bldg. Annex	823 Perdido St.	103 Thomas Bldg.

CRESCENT ENDURITE SUPER-AGING INSULATION

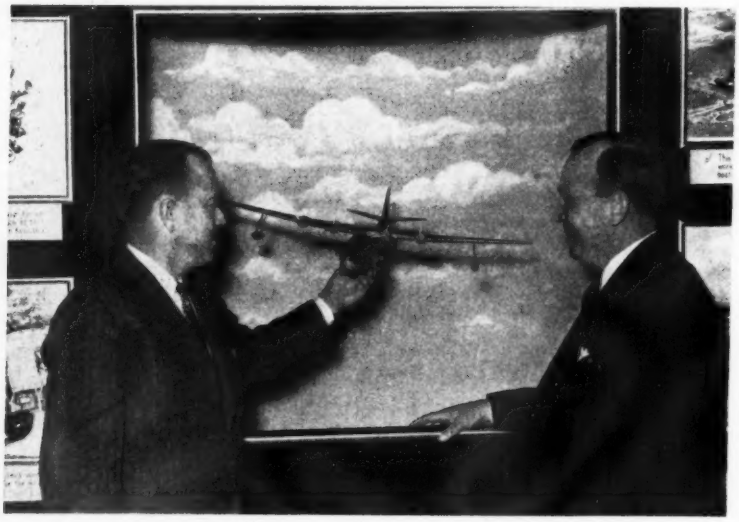
sense—a theme that capitalizes on the unusual situation, rather than stressing the misfortunes of restricted buying—and finally, a theme that appeals to patriotism today, pocketbooks tomorrow."

The first issue of this inviting 16-page paper, written in newsy style, tells how to make a window display kit with interchangeable sections that can be used to make various combinations; it also describes numerous successful window display ideas; there is a "Live Wires" department which combs the field for sparkling, usable ideas ranging from contests to check-charts; the "Booklet Prospector" names and even prices, where available, eminently usable booklets which may be had from various associations and manufacturers.

Kelvinator Distributors Meet in Detroit

Kelvinator distributors and zone managers got an inspiring first-hand impression of what 'Democracy's Arsenal' is doing when the company held its first war-time convention in Detroit last month. The entire distributing organization of Nash-Kelvinator was brought in for the four-day meeting, which included an inspection tour of the company's plants in Lansing. The Kelvinator distributors and zone managers met the latter part of the week, while the Nash men met the early part of the week.

"We wanted to give our organization first-hand knowledge of the tremendous war job the industry is doing," Vice-President Frank R. Pierce declared. "These men, in common with all automotive and refrigeration dealers, have accepted the sacrifices and financial hardships of these wartimes and at the same time have kept their faith in themselves, in the future of their business, and in the inevitable victory of America. We felt that it was up to us to show them that everything possible is being done on the production front."



One of the high spots among the displays at the recent Kelvinator convention was the model of the flying boat which Nash-Kelvinator is scheduled to build in a new plant now nearing completion. Charles T. Lawson, manager of the new plant, is shown here with Frank R. Pierce, vice-president in charge of sales, inspecting the model of the ship the company will build. The meeting served as a get-together to discuss future plans.

As part of a factory "brush up" service training school, seven Easy Washing Machine Corporation divisional managers rode the company's service trucks to study actual washer repair operations in the home. Background, left to right, J. S. Miller, H. F. Costello, W. H. Reeve, general manager of the washing machine division; G. W. Burns, assistant sales manager; G. F. Graalman. Front, B. L. Finn, advertising-sales promotion manager; G. J. Fitzgerald, J. W. Yonts and Ed Fairchild.

Easy Division Managers Attend Service School

Keynoting the new Easy service program, W. H. Reeve, general manager of the washing machine division of the Easy Washing Machine Corporation, Syracuse, N. Y., recently pointed out to the company's divisional managers in the first of a series of five-day meetings to be held at the Easy factory, that the war has caused many drastic changes in Easy's sales and customer relations policies.

In reviewing current conditions, Mr. Reeve stated, "'Conservation of the washer in the home today is more than a matter of deriving income from the sale of parts. America needs its woman power and time-and-labor saving washers help women contribute a bigger share to our overall war effort. Therefore, Easy's responsibility is clear cut. Washers must be kept in good working order for the duration. And to carry out this wartime policy we've adopted a 'shirt sleeve' factory training program which includes bench repair work by even the highest ranking executives in the washing machine division of Easy."

Spearhead of the new program is a plan to establish rebuilding stations in strategic markets. These stations would handle major repair work from dealers outside the factory dominated area.

The high light of Easy's "soiled hands" service training was a "refresher course" in reconditioning washers with each divisional manager being assigned to actual rebuilding of used washers during the five day factory session.

Further to Improve and Speed Repair and Parts Service in the Southeast . . .

GENERAL ELECTRIC

Announces the Opening of the

ATLANTA APPLIANCE SERVICE CENTER

AUTHORIZED GENERAL ELECTRIC APPLIANCE SERVICE CENTER DEALER

THE Atlanta Appliance Service Center is now ready to serve distributors, dealers, utilities and appliance users throughout the Southeast territory. Here you will find facilities for keeping in good operating condition the many thousands of G-E appliances in this area that are now so vitally important in conserving health and energy for war effort.

The Atlanta Service Center is operated by the Appliance and Merchandise Department of the General Electric Company. Here is a brief summary of its objectives.

MAJOR APPLIANCES

Refrigerators, Ranges, Water Heaters, Washers, Ironers, Dryers, Dishwashers, Electric Sinks, Disposalls, Kitchen Cabinets, and Automatic Blankets

On these products, responsibility is confined to the stocking of supply parts, and orders are honored only through the following G-E major appliance distributors: W. D. Alexander Co., Atlanta, Ga.; General Electric Supply Corp., Nashville, Tenn.; L. W. Driscoll, Inc., Charlotte, N. C.; Perry-Mann, Inc., Columbia, S. C.; Matthews Electric Supply Co., Birmingham, Ala.; G-E Factory Distributing Branch, Tampa, Fla.; General Electric Supply Corp., New Orleans, La. (refrigerator units only).

SMALL and TRAFFIC APPLIANCES

Irons, Toasters, Roasters, Mixers, Coffee Makers, Clocks, Fans, Vacuum Cleaners, Sunlamps, etc.

On these G-E products, the Atlanta Appliance Service Center handles both parts and repairs in the following states: North Carolina, South Carolina, Georgia, Florida, Tennessee, Alabama. Parts for these appliances may be purchased direct from the Atlanta Center, or through your regular G-E Distributor. Appliances for repair may be sent or brought in by either the trade or the appliance user.

We hope you will visit, at the first opportunity, this newest of G-E Appliance Service Centers and see first-hand our fine facilities for serving you.

PAUL GRAVES, District Service Supervisor

M. F. DONOHOE, Warehouse Mgr.

APPLIANCE SERVICE CENTER

GENERAL ELECTRIC

49 Auburn Avenue, N.E., Atlanta, Ga. *Telephone: Jackson 7334*

HOW TO BEND
1¼-4½ in. PIPE
3 TIMES FASTER

If you bend conduit and pipe with obsolete bending equipment or clumsy makeshift methods, Greenlee Hydraulic Benders can save you as much as 75% in bending time. Greenlee Benders, with their powerful hydraulic units, bend 3 times faster because they're easier for the man on the job to operate. The No. 770 Bender, shown above, has a maximum pressure of 25 tons for bending 1¼ to 3-inch conduit, while the larger No. 775 Bender with a maximum pressure of 40 tons will handle 3 to 4½-inch material. There's also a complete selection of Greenlee hand benders for tubing up to ¾-inch. Write for new S-116 Bender Booklet . . . it'll show you how to save time and money on every bending job.

★ HERE'S WHY YOU SAVE TIME WITH GREENLEE BENDERS

- ✓ One man can easily and quickly develop the pressure needed to bend conduit up to 4½ inches.
- ✓ You save cost and time of installing many manufactured bends and fittings.
- ✓ You eliminate expense and delay of cutting and threading nipples.
- ✓ The smooth, even bends made by Greenlee, eliminate wasted time when pulling in wire.
- ✓ The Greenlee, built in one unit, is easily carried to the job and set up and is easier for operator to handle.

GREENLEE TOOL CO.
1771 Columbia Ave., Rockford, Illinois

Virginia Chapter, IAEI, Holds Annual Meeting

The ninth regular meeting of the Virginia Chapter was held jointly with the Southern Section, in Richmond, October 19, 20, 21, 1942, at the John Marshall Hotel. An evening session was held on the 20th, strictly for Chapter business, over which C. H. Dougherty presided.

The resignation of Vice Chairman A. B. Rorer, who has been called for military service, was regretfully accepted.

The Legislative Committee reported its inability to secure passage of the Electrical Inspection Act at the last meeting of the State Legislature in which much effort had been expanded. On the advice of Chairman Dougherty and Committee Chairman J. L. Speights, it was proposed to direct future efforts through or by affiliation with the League of Virginia Municipalities and other similar groups. A rising vote of thanks was extended G. A. Sawin and Arthur L. Abbott, of NEMA, for their valued assistance in preparing this legislation.

A motion was carried, and the Secretary instructed to so advise the Southern Section secretary, recording this Chapter as in favor of any plan by which members in the armed forces may retain their membership and be reinstated without cost to them when requested.

The membership unanimously voted to request a reinstatement in the National Electrical Code of effective date on type S fuses.

On motion duly seconded and passed the Secretary was instructed to invest two hundred and twenty-five dollars in United States War Bonds.

Officers selected for the new administrative year included the following: chairman, W. C. Bradley; vice-chairman, M. G. Folkes; secretary-treasurer, G. M. Miller. Executive committee members named were E. W. Dunn, T. W. Wilmer, J. M. Murphy, and E. H Stephenson, Jr.

Walker Announces Synthetic Wire Line

Walker of Conshohocken, manufacturers of underfloor distribution systems, rigid steel, flexible and thinwall conduits, rubber, rubber and lead, and synthetic wires and cables, as well as service entrance and nonmetallic cables, has just announced a new synthetic covered wire, insulated with thermo-plastic resins, to be sold under the trade name Walker "Synthetic."

Walker "Synthetic" may be obtained in all standard colors—black, white, red, blue, yellow, green,—and in practically any other shade desired.

Among the advantages claimed for this new wire by the manufacturers are easy pulling because of its smooth, slick surface; tough and long-age characteristics resulting from its resistance to heat, oils, alkalies, acids, and moisture; high dielectric and mechanical strength; and colors that won't scuff off.

The new wire is available in sizes ranging from small diameter building wires up to large 500,000 circular mil cables. For further information write Walker Bros., Conshohocken, Pa.

Silex Plan Meets War-Time Problems

"Let's Lick our Wartime Problems Together!" That's the new slogan of the Silex Company, Hartford, Conn., as Silex introduces an entire new line of Silex glass coffee makers, along with a new dealer-distributor plan to meet today's conditions. The new Silex program answers the two greatest problems dealers and distributors face today . . . merchandising to sell, and distribution for that merchandise.

Using no strategic war materials, The Silex Company is presenting a revolutionary new percolator, a new glass drip coffee maker, a glass "Biggin." The regular vacuum-type Silex is still in production. A suitable substitute for the rubber plug will be used when present stocks are exhausted.

Under the new Silex plan, direct orders will be solicited from dealers, in consumer advertising, as well as in trade advertising and mailing pieces. To make the offer easier for distributors and dealers to accept, the new Silex merchandise has been made up into a Silex Silent Salesman assortment. This new Silex Silent Salesman assortment, list price $19.20, contains six units, enough to put any dealer in business.

Distributors receive full credit for direct dealer orders, as the dealers are compelled to name a distributor when ordering direct.

Vacuum Cleaner Stocks Frozen

The War Production Board on October 24th prohibited all sales of vacuum cleaners to civilians.

It froze all types of new domestic vacuum cleaners in the hands of manufacturers wholesalers and retailers until January 1, 1943.

Sales may be made only to the Army, Navy, lend-lease and holders of export licenses issued by the Board of Economic Warfare.

WPB said the order was issued to determine supplies of vacuum cleaners in the hands of manufacturers. All manufacturers must file an inventory report of vacuum cleaners in their stocks today.

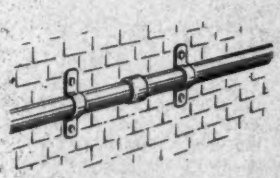
DO YOU KNOW THESE FACTS ABOUT TRANSITE DUCTS?

TRANSITE CONDUIT

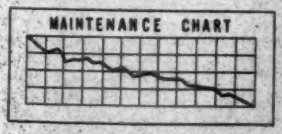
This durable duct is for use underground, or on exposed locations without a protective casing . . .

TRANSITE CONDUIT

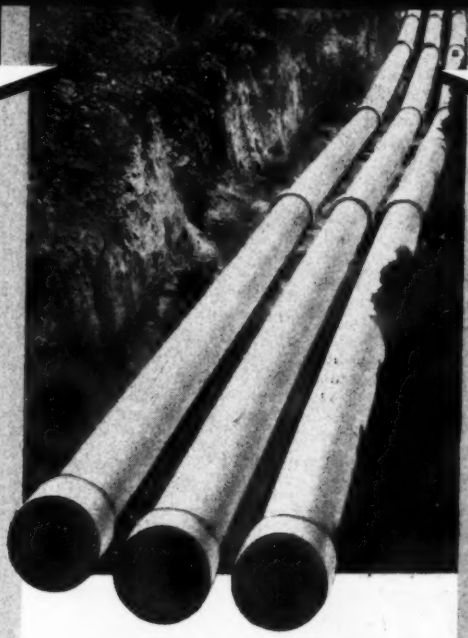
Under sustained earth loads and traffic pressure, it maintains its strength and true form . . .



Transite Conduit effectively resists weather, smoke and fumes...is virtually unaffected by corrosive soils...



Its cost is low and, in service, it is much more economical than other materials of comparable strength and durability.



. . . In addition, both Transite Conduit and Transite Korduct have these characteristics . . .

1. Incombustible—Made of asbestos and cement, they cannot burn . . . will not contribute to the formation of dangerous smoke, fumes or gases.

2. Immune to electrolysis . . .Transite Ducts are non-metallic and inorganic . . . unaffected by electrolysis.

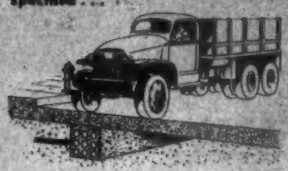
3. Smooth bore—Making cable pulls easier, both at initial installation and after years of service.

4. Easily installed—Lining up is fast and accurate because Transite Ducts combine light weight, long lengths, simple assembly.

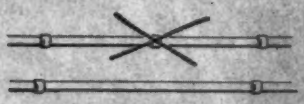
For details and specifications, write for Data Book DS-410. Johns-Manville, 22 E. 40th St., New York.

TRANSITE KORDUCT

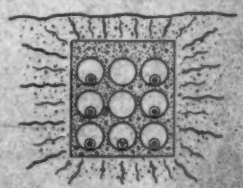
Thinner walled, lower priced than Transite Conduit, Transite Korduct is for use where an encasement is specified . . .



Because Korduct is incombustible, less concrete is required between ducts to provide the necessary degree of fire protection.



Its long lengths (10 feet) mean fewer joints, reducing the number of spacers required . . .



Its high rate of heat dissipation lowers cable operating temperatures . . . increases system capacity . . .

Johns-Manville

TRANSITE DUCTS

TRANSITE KORDUCT—for installation in concrete

TRANSITE CONDUIT—for exposed work and installation underground without a concrete encasement

PERSONAL NOTES
About Men You Know

The appointment of **Don G. Mitchell,** as vice president in charge of Sylvania Electric Products Inc., to be effective as of November 1st, was announced recently by **W. E. Poor,** executive vice president. This is a new office, established to plan and direct the distribution and merchandising of all Sylvania products.

Don G. Mitchell

Sylvania, an important factor in the fields of electronics and flourescent lighting, is today engaged almost 100 per cent in manufacturing products vital to the war effort. These same products, however, are expected to open up large new consumer fields after the war.

Mr. Mitchell served as vice president in charge of sales of the Pepsi-Cola Company during its period of remarkable growth. Previously, he had been associated with the American Can Company.

* * *

Don J. Mohler, widely known photolamp expert at GE's Nela Park, Cleveland, and **Robert W. Morris,** prominent Nela photolamp engineer, have just been transferred to the Pacific Coast and to Washington, D. C., respectively.

Mr. Morris will devote most of his time to special lighting problems for the Bureau of Ships, a branch of the U. S. Navy Department. Mr. Mohler in his new work will head up GE photolamp activties in the Company's Rocky Mountain, South Pacific, Pacific and North Pacific divisions.

* * *

Ward R. Schafer, Hotpoint range division manager, and for 18 years a member of the Hotpoint organization in Chicago, has resigned to accept a position with the Geo. A. Fuller Company to direct the installation of electrical equipment and apparatus in various war production plants being erected for the Government and private enterprise by that national building and contracting firm. Mr. Schafer reports to the Fuller headquarters at Cleveland before taking up his first assignment which is expected to take him "somewhere south."

Ward R. Schafer

* * *

J. O. Wetherbie has been appointed manager of General Electric wiring materials district No. 2, with headquarters at 570 Lexington Ave., New York, N. Y., according to an announcement by **J. H. Crawford,** manager of sales, G. E. construction materials division, Bridgeport, Conn. This assignment is in addition to Mr. Wetherbie's present responsibility as special representative coordinating the activities of General Electric's appliance and merchandise department and other departments of the company on large governmental, commercial, industrial and residential construction projects.

In his new assignment, Mr. Wetherbie will have charge of General Electric wiring materials sales along the Atlantic seaboard from New York City to Charlotte, North Carolina. He will be assisted by seven field representatives.

* * *

Appointing of **Ralph C. Stuart** as manager of manufacturing to supervise production at five plants of the Lamp Division of the Westinghouse Electric and Manufacturing Company, Bloomfield, N. J., was announced by D. S. Youngholm, vice-president. Mr.

THERE'S A MARKET AS WIDE AS THE NATION

SELL Revere New ORIGINAL FLOODLIGHTS

No. 4200 Enclosed Type Floodlight

A REVERE development of outstanding merit. Has rotation stop, a very important feature when servicing and relamping.

A WAR TIME NECESSITY

REVERE Hinged Floodlight Poles. We are the Originators of Hinged Poles . . . offering ease of maintenance keeping floodlights at maximum efficiency . . . eliminating risky climbing.

180° Fresnel Lens—Wide Angle Floodlight — originated by REVERE for Protective Lighting. Available in 4 styles.

You'll make many friends when you concentrate your sales efforts on the REVERE Line. REVERE offer the most complete series of Floodlights for defense construction and protective lighting . . . with exclusive features offering ease of wiring, installation and maintenance. Get acquainted with REVERE, originators of the 180° Fresnel Lens Protective lighting units now used in shell loading plants, arsenals, etc. There are many other REVERE Units that fit the need for war time industry. Write us for full particulars. Be prepared for the business that's available by offering REVERE equipment.

REVERE ELECTRIC MFG. CO.

2939 NORTH PAULINA STREET · CHICAGO

Originators of the Hinged Floodlight Pole

INDOOR and OUTDOOR LIGHTING EQUIPMENT of EVERY DESCRIPTION

Stuart was formerly manager of parts manufacturing at the Lamp Division.

In his new post, Mr. Stuart will be in charge of the manufacture of all incandescent and fluorescent lamps made by Westinghouse. He will also supervise the Lamp Division's war production which includes radio transmitting tubes, X-ray tubes, and special electronics devices.

Mr. Stuart was manager of the West Plant of the Canadian Westinghouse Company at Hamilton, Ontario, until January of this year when he was appointed manager of parts manufacturing for the Lamp Division. He first joined Westinghouse in 1918 as an assistant foreman at Bloomfield. In 1920 he was transferred to the Canadian Westinghouse Company. He was made superintendent of the plant in 1921, and manager in 1930.

* * *

Dwight L. Casey, executive secretary of the North Carolina Association of Electrical Contractors, has been released to assume the position of representative of the National Electrical Contractors Association for Division No. 5, which includes the States of Tennessee, Virginia, North and South Carolina, Georgia, Florida, Alabama, and Mississippi. Mr. Casey will continue to serve in directing the work of the state association, with an assistant, Miss Virginia L. Cathey, as office secretary in charge of the Charlotte Headquarters of the association.

* * *

C. B. Vick, industrial sales manager for the Florida Power & Light Company, was recently commissioned a lieutenant in the Navy and reported on September 1st at Cornell University for special training.

Mr. Vick is a graduate of Georgia Tech, and was formerly connected with General Electric Company in Schenectady, and Atlanta, before going to Florida.

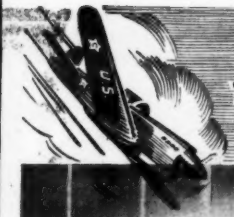
* * *

H. V. Putman, manager of the Westinghouse Transformer Division, was recently elected to the rank of vice president by the Board of Directors of the Westinghouse Electric and Manufacturing Company.

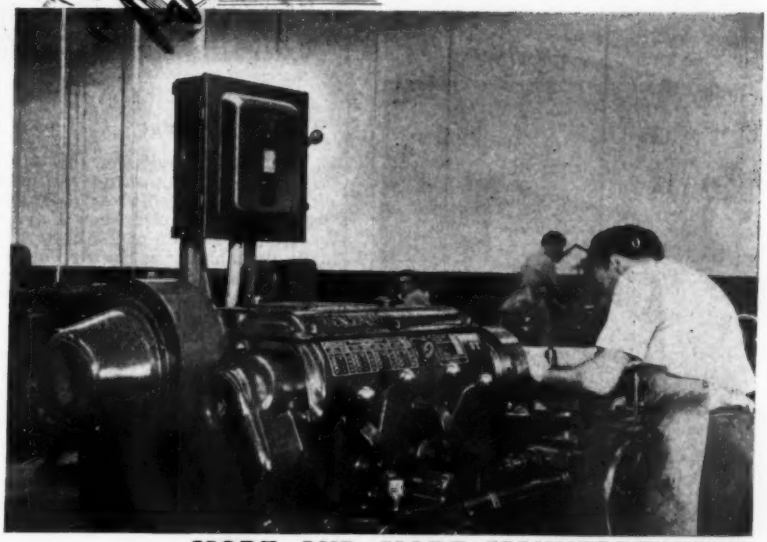
Mr. Putman was appointed manager of the Westinghouse Transformer Division, largest transformer plant in the country, in November 1940. Transformer production to meet the requirements of expanding war industries and power stations has more than doubled in the past two years.

* * *

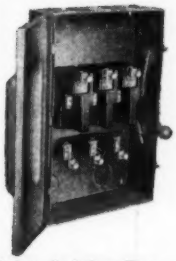
It was recently announced by **R. B. Wilson,** executive vice-president, Electric Vacuum Cleaner Co., Inc., Cleveland, Ohio, that **R. W. Secrest,** has been appointed service manager to meet the war-time need of helping dealers make money through servicing electric home appliances. Prior to his new appointment, Mr. Secrest was Cleveland division manager for Premier. Previously, he was Detroit division manager.



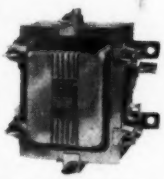
TO DO THE JOB BETTER...



MORE AND MORE MANUFACTURERS USE *Federal* SWITCHES ON JOBS LIKE THIS*



Safety Switches Type "A", "C" & "D" 30 to 1200 amperes Single and Double Throw



Weatherproof — Dust-tight Switches 30 to 1200 amperes

Complete line of circuit breakers and fusible panelboards

Today only one thing is important—Victory. There's no time left to lose—just time to WIN. That's why the men who know . . . the men turning out the planes, guns, ships and tanks are switching to Federal. The story's the same all over the country . . . wherever the pressure's on . . . wherever plants are going full blast twenty-four hours a day, seven days a week . . . wherever the job must be done better and faster . . . Federal Safety Switches are at work.

These "producers for Victory" find many advantages in Federal safety switches—trouble-free operation on essential circuits—ribbed arcing chutes—patented "griptite" fuse clamps—and many other exclusive Federal features. You will, too!—when you switch to Federal to get the job done better and faster.

*This photograph was taken in the plant of a large manufacturer of airplane parts. For obvious reasons the name of the manufacturer cannot be divulged.

Southern Representative:
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Jackson 2146

FEDERAL ELECTRIC PRODUCTS COMPANY
60 PARIS STREET, NEWARK, N. J.
PANELBOARDS • SWITCHBOARDS • SAFETY SWITCHES • CIRCUIT BREAKERS

Did You Know

that the engineering principles of "Gorilla Grip" Mechanical Connectors call for precisely machined pressure contact with a high electrical efficiency?

The illustration above shows how this machined pressure contact actually bites into the copper. The large indentations in the copper conductors are made by the lockring. The smaller ones are caused by the serrated inside surface of the sleeve.

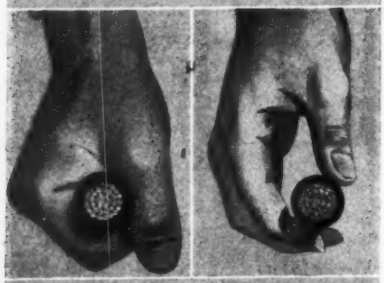


Figure A. Figure B.

It is common knowledge that you can better hold a round object by gripping it around its complete outside surface (Figure A) and not as shown in (Figure B) compressed between finger and thumb. A complete peripheral grip, as shown in Figure A, is formed by the "Gorilla Grip" Connector.

Gorilla Grips compact the conductor in such a manner as to eliminate all loose contact or distorted conductors, thereby eliminating high resistances which in turn cause heat and voltage drop.

Write today for booklet, explaining in detail, the fine features of "Gorilla Grip" Connectors.

National Electric
PRODUCTS CORPORATION
300 FULTON BUILDING, PITTSBURGH, PA.

NEW EQUIPMENT and MATERIALS

Q-Floor Fittings

Complete details on the electrical fittings and accessories for utilizing the cells of Robertson Q-Floors as an electrical under-floor distribution system are contained in a new bulletin available from the Appliance and Merchandise Department, General Electric Company, Bridgeport, Conn.

Q-Floors are cellular steel floors, combining great strength and light weight with considerable economies and advantages to the building owner. The Q-Floor materials are manufactured by H. H. Robertson Company, Pittsburgh, although the electrical fittings which make Q-Floors available for electrical distribution are merchandised by the Appliance Merchandising Department of General Electric Company. By the use of the electrical fittings, Q-Floors provide an underfloor distribution system which surpasses by far any conception of electrical adequacy of any other system. It is possible, for example, to install eight outlets in one square foot of floor area.

There are six basic types of Q-Floor units. Each unit is composed of four cellular steel members. The size and shape of the cellular members as well as the gauge of steel used, depends entirely on structural and mechanical conditions. The individual interlocking units are laid over the entire floor area spanning from beam to beam. They serve both as structural load-carrying members and as raceways for the electrical conductors.

The bulletin available from the General Electric Company illustrates the various types of floor units available as well as the various electrical fittings that may be used with them. Typical installations are shown in the accompanying illustrations.

Trumbull Control Centers

The Trumbull Electric Mfg. Company, of Plainville, Conn., has just issued a 20-page bulletin describing and illustrating their entire line of control centers, including motor control centers and switchboard control centers.

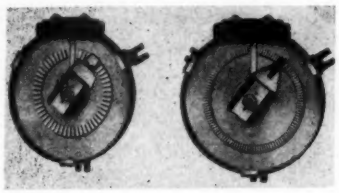
These control centers consist of vertical troughs in which bus bars carry power, into which are plugged combination units of magnetic starters and disconnects Sizes 1, 2, 3 and 4, and switch and circuit breaker units 30 to 600 ampere.

Robertson Q-Floor units laid in place on one of the buildings of the Ternstedt Manufacturing Co., Trenton, N. J. The units which make up this floor are spanning between beams and the cells which make up the units are on 6-inch centers. Thus, a wiring raceway is provided every 6-inches, over the entire floor area. Such floors always will be available for future installations of outlets for motor-driven machinery. Changes and additions can be completed by the plant electrician quickly, easily and economically. Such a floor system is distinguished by 100% electrical availability, throughout the life of the building.

All of these units are standardized and prefabricated, thus saving weeks of engineering time in layouts, conserving space, reducing installation and operating costs. Copy of Bulletin 411 will be sent on request.

W-L Rheostat Bulletin

Ward Leonard Pressed Steel Rheostats with solid rectangular contacts provide a finer degree of control, smoother operation, and certain economies where interpolating rheostats would otherwise be required.



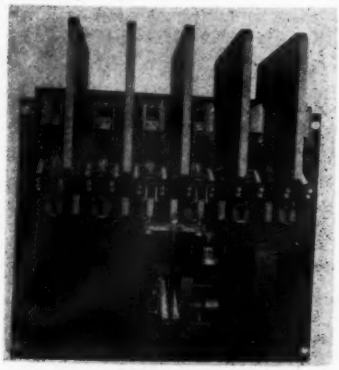
Rectangular contacts are available in small and large sizes. Small rectangular contacts can be furnished on thirteen inch or smaller rheostats. Large rectangular contacts can be furnished on eight inch or larger rheostats.

Rheostats with rectangular contacts can be furnished with complete enclosures, fittings for conduit connections, motor drives and with accessories for floor, back-of-board, and concentric mounting. Fixed and adjustable stops to protect control equipment can be provided.

These and other rheostats are listed in a new sixteen page Bulletin 60, available on request. Ward Leonard Electric Co., Mt. Vernon, N. Y.

High Speed Air Breaker

A new high-speed air circuit breaker developed by the General Electric Company minimizes "arc back" — a problem engineers have been battling since the first commercial mercury arc rectifier installation. Application of the new Type AG-1 breaker will lessen the possibility of power interruptions in war plants using direct current for the reduction of vital metal such as aluminum and magnesium, and for various continuous processes. The new breaker removes



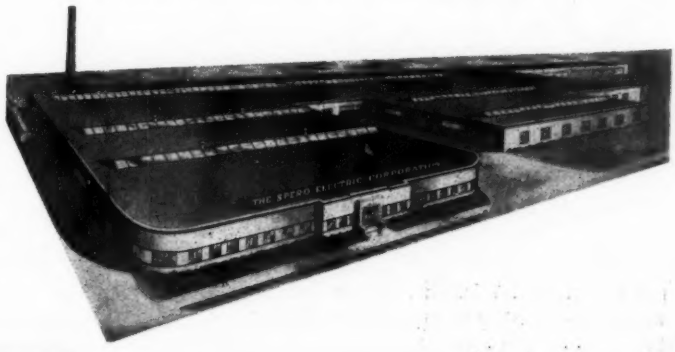
SPERO

...5 LINES

Fluorescent Fixtures. Vapor Proof Units
Incandescent Reflectors. Floodlites
Electrical Construction Materials

From One Dependable Source
Immediate Deliveries . . . Save
Time And Aid War Effort

A big modern factory, 30 years' experience and 5 lines of products tuned to today's demands, from one dependable source save time, speed installation, avoid costly delays. Write today for complete information.



THE SPERO ELECTRIC CORPORATION
18222 LANKEN AVENUE ★ CLEVELAND, OHIO

short circuits in less than one cycle, or faster than 1/60 of a second.

The new breaker design utilizes the effect of magnetic loop expansion. This works to a double advantage. Where the circuit is normal, the increased pressure at the contacts prevents burning of their surfaces. But when the breaker is tripped during abnormal circuit conditions, the magnetic loop expansion effect helps get the contacts separated quickly. Low-inertia moving parts in the device further speed the break.

A high-speed current directional trip initiates the opening of the contacts. Responsive only to the reverse current flow of an arc back, it starts the action of the new breaker in less than one-half cycle. The breaker has an arc chute of the magnetic blow-out type which multiplies the magnetic effect of the current through it and rapidly lengthens the arc back to its extinguishing point. The breaker automatically closes the cleared circuit in about one minute.

South Bend Turret Lathe

A new bench model turret lathe for rapid production to close tolerances on chucking operations or bar work has just been announced by the South Bend Lathe Works. This lathe has a 10" swing over the bed and saddle wings, 1⅝" hole through the headstock spindle, and 1" collet capacity. It is well adapted to second operation work.

The handlever operated bed turret indexes automatically and has an adjustable stop for each of the six turret faces. The lathe is equipped with both a compound rest cross slide and a handlever cross slide, which are interchangeable. The latter is furnished with front and rear tool blocks which provide three tool positions. A quick change gear box supplies 48 longitudinal power feeds for the universal carriage, 48 power cross feeds for the compond rest cross slide, and 48 thread cutting feeds, 4 to 224 per inch. The underneath motor drive and back gears deliver twelve spindle speeds, from 97 to 700 rpm.

A large assortment of attachments and accessories simplify tooling.

Trico Co. Bulletins

Helpful information as to more efficient maintenance, safety of manpower, economical methods of lubricating and protecting industrial and electrical equipment is now available through a series of bulletins, prepared by the Trico Fuse Mfg. Co., Milwaukee, Wisconsin.

Bulletin No. 4500-C tells how to overcome unnecessary shutdowns due to faulty fusing and poor fuse and clip contact, and how to keep up today's ever-increasing production schedules with less maintenance cost.

Bulletin No. 4600-OB illustrates and explains in detail—with drawings—the ways and means of preventing oil waste—shutdowns of machinery due to improper lubricating—shows how to save time—money and effort in maintaining operation of machinery vital to today's production.

These bulletins have been prepared in such a way as to be easily inserted into catalogs.

Precision Instruments

Leeds & Northrup Company has just issued a distinctive publication of general interest to engineers, research scientists, executives and users of electrical instruments, controls and furnaces, called "Modern Precision." It contains news of L&N instruments, controls and heat-treating methods, and of the jobs they are doing in industry, in research laboratories and in teaching and testing. An addition to other L&N literature, it supplements the regular catalogs, bulletins and circulars which will continue to be issued as before.

"Modern Precision" has 16 pages, 10½ inches by 15⅝ inches. It contains valuable information for a wide variety of industrial, educational and scientific fields. A copy can be had upon request to Leeds & Northrup Company, Philadelphia, Pennsylvania.

Air-Cooled Voltage Regulator

Especially designed for feeder circuits where exacting voltage regulation requirements must be met, and liquid cooling is undesirable, a new, low-cost, air-cooled voltage regulator for indoor use is announced by Westinghouse Electric and Manufacturing Company.

Known as type SA, the regulator is intended for single phase feeders, 2400 volts, 50 to 300 amperes, and 4800 volts, 25 to 150 amperes. Single phase units can be used in banks on polyphase circuits two units in open delta on 2400 or 4800 volt 3-wire circuits or three 2400-volt units on 4160 volt 4-wire circuits. All ratings have self-contained power for motor and other control functions.

No liquid cooling is required, and winding insulation is flame resisting to reduce hazard from fire or electrical failure. For low maintenance and continuity of service, a new design of voltage regulating relay eliminates the usual assembly of delicate pivots, pins, and springs. Separate transformers prevent operation of the motor from affecting the relay.

THEY FIT ALL RANGES, and with a small stock you can meet every need, with instant, on-the-spot service.

THOUSANDS NOW IN SERVICE giving complete satisfaction in ranges everywhere. A quick-heating, economical, enduring unit, which has proven its quality under the test of several years in the kitchens of America.

Replacement rings for Chromalox two and three ring units, still available.

Keep 'em cooking with Chromalox! Write us for details.

ATLANTA, Ga.—C. B. Rogers, 1000 Peachtree St. DALLAS, Texas—L. R. Ward, 403 Southland Building Annex. RALEIGH, N. C.—W. R. Phillips.

EDWIN L. WIEGAND COMPANY, 7600 THOMAS BLVD., PITTSBURGH, PA.

Statement of Ownership

Statement of ownership, management, circulation, etc., required by the Act of Congress of Aug. 24, 1912, and March 3, 1933, of Electrical South, published monthly at Marietta, Georgia, for October 1, 1942.

State of Georgia, County of Fulton.

Before me, a Notary Public in and for the State and County aforesaid, personally appeared J. C. Martin, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the Electrical South, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication, for the date shown in the above caption required by the Act of August 24, 1912, as amended by Act of March 3, 1933, embodied in Section 537, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1. That the names and addresses of the publisher, editor and business manager, are:
Publisher, W. R. C. Smith Publishing Co., Atlanta, Ga.
Editor, Carl W. Evans, Atlanta, Ga.
Business Manager, J. C. Martin, Atlanta, Ga.

2. That the owners are:
W. R. C. Smith Publishing Co., Atlanta, Ga.; Estate of W. R. C. Smith, Atlanta, Ga.; J. C. Martin, Atlanta, Ga.; O. A. Sharpless, Atlanta, Ga.; T. W. McAllister, Atlanta, Ga.; W. J. Rooke, Atlanta, Ga.; E. W. O'Brien, Atlanta, Ga.; J. C. Cook, Atlanta, Ga.; R. P. Smith, Atlanta, Ga., and Mrs. E. L. Philpot, Atlanta, Ga.

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J. C. MARTIN,
Business Manager.

Sworn to and subscribed before me this 10th day of October, 1942.

SEBA J. JONES,
Notary Public at Large.

Lighting for War-Time Offices

(Continued from page 8)

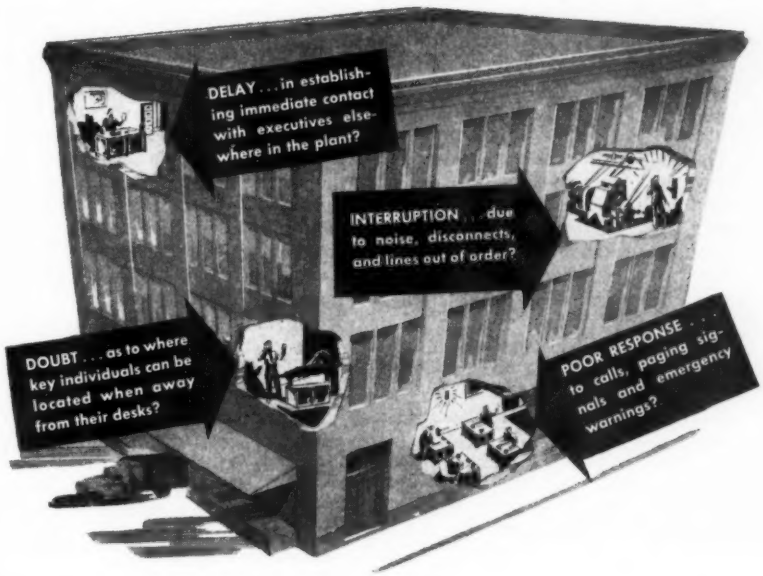
flection factor white ceiling will not only increase the illumination but will also provide for better diffusion of the light, reduce shadows and harsh contrasts.

The chief benefits of light walls are the improved atmosphere and environment and the increased illumination near the walls. Most lighting installations are so designed that nearly uniform illumination will be provided across the room from wall to wall if the walls are painted some bright color with 50-60% reflectivity.

When a person shifts his eyes from a bright area to a dark one, his eyes must readapt themselves to the different intensity. The

DOES YOUR PLANT SHOW THESE SYMPTOMS OF

CLOGGED COMMUNICATION?


DELAY . . . in establishing immediate contact with executives elsewhere in the plant?
INTERRUPTION . . . due to noise, disconnects, and lines out of order?
DOUBT . . . as to where key individuals can be located when away from their desks?
POOR RESPONSE . . . to calls, paging signals and emergency warnings?

THEN YOU NEED THE HELP OF A GRAYBAR COMMUNICATION SPECIALIST

Why not put your plant communication problems up to a specialist familiar with the *complete range of such equipment* . . . one who can help you choose the type or combination of types best suited to your needs for talking, paging, public address or alarm?

GRAYBAR supplies Inter-Phone systems, Webster Teletalk systems, Edwards paging and signaling equipment and everything else that's needed to install all types of plant communication and alarm systems. By planning all such services as a unit, you avoid duplicating functions and save on wiring and critical materials.

If better communication can help speed a war job or guard essential services, GRAYBAR can see to it that you are promptly and properly equipped. Just call your local GRAYBAR office.

GraybaR

Everything Electrical . . . . THAT IT TAKES TO WIN!

IN OVER 80 PRINCIPAL CITIES
Executive Offices: GRAYBAR BUILDING, NEW YORK, N. Y.

eyes accomplish this by two means: (1) the pupil becomes larger to let in more light, and (2) the retina becomes more sensitive to light. When the person looks back at his work, his eyes must go through this procedure in reverse. Since a worker looks up rather frequently to "rest" his eyes by allowing them to focus on a more distant object, it is evident that it is quite important that he look up into light surroundings.

The value of proper painting is indicated by the accompanying diagram which shows the relative utilization of the light from three different types of luminaires for several combinations of ceiling and wall reflection factors. This bar diagram bears out the statement made above that high reflection factor surfaces are important with all types of lighting installations and are particularly essential with indirect installations.

For an example of the direct benefits of painting, let us turn to the general office of a manufacturing concern. An average illumination level of 17 footcandles was provided by the general diffuse lighting system before indirect luminaires with higher wattage lamps were installed on the same outlets. Before painting, this indirect installation provided only 21 footcandles; but when the ceiling was painted an egg-shell white, the illumination level was increased to 33 footcandles. This increase of nearly 60% was due to painting alone and does not include the more intangible benefits of better diffusion and improved seeing comfort.

Maintaining Lighting Equipment

Improper attention soon reduces the efficiency of any lighting system, but a regular, planned maintenance program will assure peak efficiency and prolong the useful life of the lighting equipment. There is no point in spending enough money on lighting equipment to provide 50 footcandles and then neglect the equipment so that only 25 footcandles are actually provided.

A well-planned program should make provision for both phases of the maintenance problem: (1) cleaning of all lighting equipment to remove dust and dirt, and (2) relamping luminaires immediately after lamp burnout or on a systematic lamp replacement plan.

No definite cleaning period can be recommended which will be satisfactory for all applications. The rate of decrease in light output varies with the type of lighting equipment and with the amount of dust and dirt in the atmosphere. The best method of establishing a cleaning schedule is to make periodic checks of the illumination with a light meter. As a general rule, when the illumination drops to approximately two-thirds of its initial value, the equipment should be cleaned. Rechecks will not be necessary once the length of time in which this decrease occurs has been determined. Generally speaking, the lighting equipment should be cleaned every three or four weeks in extremely dirty locations, but under average conditions, a cleaning period of from two to six months will be adequate.

The luminaires (including the lamps) should be thoroughly cleaned by washing with soap and warm water. Merely wiping the reflector or glass off with a dry cloth is not only insufficient but is apt to shorten the life of the reflector. The greasy dirt and grime which remains after several dry wipings will tend to form a permanent coating which cannot be removed in any way. Actual tests have shown that the illumination may be increased as much as 10% or 15% more by washing instead of dry wiping.

Lamp Replacement Plans

The rated life of a lamp is the average life of a large number of lamps and is not indicative of the life of any one lamp. The life of some lamps will be shorter than the rated hours while others will burn longer than the rated life. The lamps will, therefore, burn out at sporadic intervals with maximum number of burnouts occuring at or near multiples of the rated life. The burned out lamps may either he replaced as the burnouts occur or on a group replacement plan.

If the group replacement plan is used, it may be combined with the cleaning program by working out the cleaning schedule so that the lamps are approaching the end of life at some even multiple of the period between cleanings. At that particular cleaning, which may be somewhere between 80% and 90% of normal lamp life, the entire installation is relamped and the system is restored to practically its initial efficiency. The old lamps which are close to the end of life are discarded, but those showing signs of further useful life are set aside to replace the few early burnouts which will occur in the next group of lamps.

The advantages of this plan are: (1) few burnouts during working hours — the group replacements may be made in the evenings when the activities of other employees working in the area will not be disrupted; (2) decreased labor cost of lamp replacement — there will be less wasted effort and setup time required when all lamps are changed at once, and since the cleaning and relamping are done at the same time under this plan, the additional labor required for relamping the luminaires as they are cleaned will be almost negligible; and (3) restoration of the installation to practically initial efficiency at definite intervals.

An important consideration that is often overlooked with fluorescent lighting is the necessity of relamping immediately when a lamp fails. If such continuous flashing is permitted over a period of time, the starter will become defective and the ballast may be injured.

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The maintenance of the lighting equipment in most offices may be done from stepladders, but many establishments—particularly those with very high ceilings—have found that movable telescoping platforms are cheaper and more satisfactory. These telescoping platforms may be obtained in various sizes to meet the individual's needs and are small enough to be moved through the doorways and put on elevators when collapsed.

Benefits from Proper Maintenance

The importance of frequent cleaning may best be illustrated by a few case studies. Tests made on an installation of indirect luminaires over a period of two months showed that during that time the average illumination level dropped from 43 to 37 footcandles—a decrease of 15%. Since this office was not occupied during this period, the lamps did not have many burning hours over that period of time, and the decrease in illumination was almost entirely due to dust collection.

This is borne out by a later test on another indirect installation where the illumination was increased from 22 to 26 footcandles by cleaning. This is a 15% increase and is due entirely to cleaning. Several months later this same installation was providing only 18 footcandles, but the illumination was brought back up to 25 footcandles—a 40% increase—by cleaning. Laboratory tests on a dirty luminaire removed from service showed a 23% decrease in light output due to dirt alone.

Do You Know?

the proper method of making connections for a polarity test on a three-phase delta connected stator? How to lay out armature windings of the split-loop type? The theory of operation and the many types of circuits utilized in capacitor-type split phase motors? Methods of reversing rotation of a-c and d-c motors? How to eliminate brush troubles? Select the best type of varnish?

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Electrical Maintenance For War-Time Service

(*Continued from page 15*)

miss any, you have your assistant go through the house and try every switch making a note of those lights and outlets that are "working."

"If you have more than two circuits in your home, just follow the same procedure, tightening the fuses, one at a time, and making a list of all the lights and outlets that go on each time. When you have finished, you will know where each wiring circuit in your home goes. Keep the list near the fuse box, where you can refer to it quickly in case of fuse blows. (Exhibit chart No. 10)

"This information about your wiring circuits and where they go is all important in preventing overloaded circuits. For instance, your electric roaster is a wonderful time-saver when you have a big day's work that keeps you out of the kitchen—like a full day's ironing. You may say, "But a roaster meal on ironing day would overload one circuit." It would blow the fuse and you might lose more time than the roaster-meal had saved. However, you can let the roaster cook dinner while you iron if your circuits share the load.

"You see, most of the work is done on this side of the house. It would be the natural thing to connect the roaster in the kitchen or dining room and, of course, the iron, too. But you have found out that these are all on one circuit. That means the wiring in this circuit is probably overworked so, instead, you connect the roaster to the outlet served by the other circuit and in this way, both the roaster and the iron can be used at the same time. Each gets its full share of electricity and the wiring is not overloaded.

'We realize, of course, that this procedure may not prove to be as convenient as you might wish. In peacetime, we would be quite frank in recommending that you avoid overloaded circuits by having an extra circuit installed. But this is wartime—and it is part of our responsibility as homemakers to use our equipment carefully, and that includes electric wiring."

Getting Maximum Use From Equipment

(*Continued from page 13*)

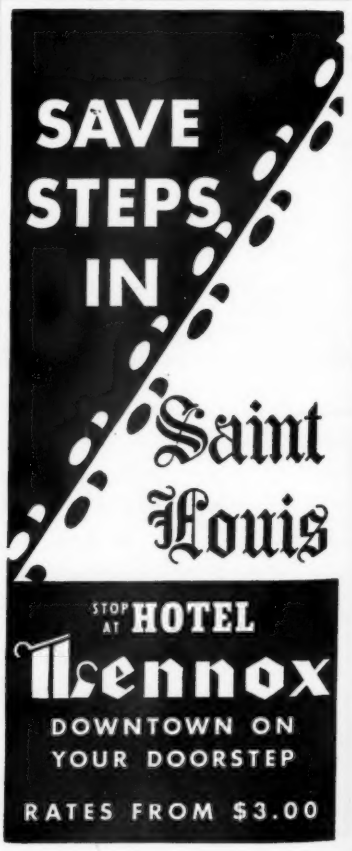
imately 30 per cent reduction in the amount of copper wire used.

2. When controllers are built to order for a specified horsepower, busses, terminals, and wiring should be specified in a size no larger than the minimum required by the application for which the controller is designed.

3. No controllers should be specified of a capacity in excess of the minimum required for the application.

4. No equipment or device should be specified for a controller which can be eliminated without causing severe operating hazards. This equipment includes indicating lamps, special name plates, instruments, test receptacles and jacks, extra terminals, special locks, and items for the improvement of appearance. If specifications are cut to the minimum for successful operation, many tons of critical material will be saved.

5. Control circuit wiring should be specified in a size no larger than the minimum required.



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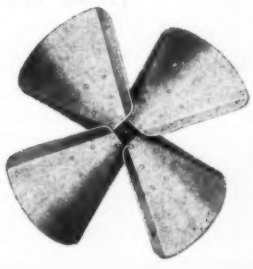

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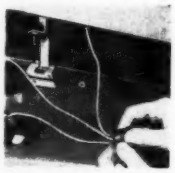

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6. Controllers should not be specified with finishes containing critical materials unless these finishes are absolutely necessary to maintain operation of the controller.

7. Color coding of controller wiring should not be specified, unless absolutely necessary. Color-coding specifications force manufacturers to carry larger stocks of wire than necessary if one color wire is used.

8. Control circuit transformers should not be specified, unless the line voltage is higher than 600 volts, or unless suitable pilot devices of adequate voltage rating are not available.

9. Control circuit fuses should not be specified if the control transformers have less than a 2,200-volt primary winding or the control circuit is direct current.

10. Where full voltage starters are available, and, if motor design will permit, reduced voltage starters should not be specified unless torque must be limited, or unless system capacity makes full voltage starting impossible.

11. If manual controllers of suitable ratings are available, magnetic controllers should not be used, except where pilot devices are essential to the operation controlled or where lack of under voltage protection would result in definite danger to human life.

Electrical Layouts

1. For new plants or extensions, the utilization voltage should be restricted to 440 volts, alternating current, except where motors 100 horsepower and larger are used, in which case the voltage should be 2,200 volts or more. (This means that all integral horsepower a-c motors shall be supplied at 440 volts.)

2. No auxiliary or reserve busses or their attendant equipment should be provided.

3. Network distribution systems should not be used unless they show an over-all saving in critical material.

4. No equipment of any kind should be installed to provide for future loads or extensions.

5. No duplicate feeds or loop feeds should be used if any appreciable amount of material is required above that necessary for a single radial feeder.

6. All busses and feeders should be tapered as to size where long runs are used with loads being taken off along the run.

7. Requirements in all cases should be based on demands after load factor is considered, and all equipment specified so it will be loaded as near name-plate rating as possible.

Ratings Not to Exceed Load

1. No electric motor and control should be purchased for any use unless reasonable effort has been made to obtain used or second-hand equipment, unless the maximum number of shifts are used, or unless reasonable effort has been made to adapt to the application idle equipment in the possession of the user.

2. No electric motor and control should be purchased for replacement of existing equipment for reasons of breakdown, damage, or obsolescence, unless reasonable effort is made to keep equipment in operating condition by installation of renewal parts or a reasonable amount of maintenance work.

3. No electric motor or control should be purchased in a size larger or of more complex design and construction than is required by the minimum operating conditions.

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113. INTERPRETING THE NEW CODE IN TERMS OF NEW BUILDING WIRES—A new booklet describing the rulings on thin, heat-resisting and synthetic insulations are carefully simplified. The ratings of the newly recognized types of wires and the new ratings for Type R are graphically shown in tables for both the new and rewiring classes of work. General Cable Corporation, 420 Lexington Avenue, New York, N. Y.

114. IDEAL PRODUCTS CATALOG — A special 25th anniversary catalog has just been issued describing the complete line of Ideal Products. Electrical Contractors, Motor Rewinders, and Industrial Maintenance Electricians will be particularly interested in this comprehensive publication. Ideal Commutator Dresser Company, 1270 Park Avenue, Sycamore, Ill.

115. FLUORESCENT LIGHTING ACCESSORIES—Fall Bulletin No. 3, describing and illustrating complete Lloyd line of Fluorescent Lamp Holders, Starters, Starter Sockets and Holder and Socket combinations. Lloyd Products Company, Providence, R. I.

117. MECHANICAL CONNECTORS—First Aid for electrical systems through the use of mechanical connectors is the subject of an interesting twenty-page booklet now available. In addition to specific construction and sales of the new "Gorilla Grip," this booklet describes a wide range of mechanical connectors for every size and purpose. National Electric Products Corp., Pittsburgh, Pa.

120. SQUARE D COMPANY announces the Spring issue of the Square D Digest, dated April, 1941. This condensed catalog contains listings and the latest prices of many Square D products, including Safety Switches, Service Equipment, Multi-breakers and other Circuit Breakers, Panelboards, Motor Control and Pressure Switches. Square D Company, Detroit, Michigan.

129. BULLETIN 403 on BullDog enclosed bus bar system of electrical distribution for commercial and industrial use. Forty-four pages of construction details, applications, dimensional data and technical charts. BullDog Electric Products Company, 7610 Jos. Campau Ave., Detroit, Michigan.

132. INDUSTRIAL WIRING HANDBOOK—This 48-page handbook, called "Adequate Wiring for Industry," describes modern factory wiring methods and materials. Wiring practices adaptable to all factories are outlined. Publ. No. 51-4011. General Electric Co., Appliance and Merchandise Dept., Bridgeport, Conn.

142. ELECTRICAL CONDUIT — Complete technical information on corrosion-resisting asbestos-cement ducts for underground and over-head service, with and without concrete envelop, is included in "Transite Conduit and Korduct for the Electrical Industry," DS Series 410. Johns-Manville, 22 East 40th Street, New York, N. Y.

148. LITTLE GIANT RELAY — A new small Relay for use on A.C. or D.C. is described in a Ward Leonard Bulletin No. 105. The Relay is available in single pole, single or double throw contacts. On standard frequencies, coils can be obtained for 6 to 230 volts. Complete information on contact rating is given in the bulletin. Ward Leonard Electric Company, Mount Vernon, N. Y.

149. ELECTRIC RANGE UNITS—Chromalox Bulletin CF-107 lists proper assembly and adaptor ring to fit any range, regardless of age or make. Inventory investment and servicing reduced to minimum. Units same as used on many makes of new ranges. Edwin L. Wiegand Co., 7600 Thomas Boulevard, Pittsburgh, Pa.

155. ELECTRICAL CONNECTORS — 325-page catalog describing and illustrating Burndy clamp connectors for overhead distribution and transmission, substations, grounding, underground distribution and industrial wiring. Contains 84 pages of useful technical information. Company asks that requests for the catalog, Catalog No. 40, be written on company letterhead. Burndy Engineering Co., Inc., 107 Eastern Boulevard, New York City.

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158. ELECTRIC MOTOR REBUILDING MATERIALS CATALOG — 28 pages — gives complete descriptions, specifications and prices on all materials and replacement parts necessary for the electric motor rebuilding shop. Insulation & Wires, Inc., 2127 Pine Street, St. Louis, Mo.

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160. ELECTRICAL CONNECTORS — Complete up-to-date catalog of Handy Electrical Connectors and devices for repair, maintenance and new construction. Ask for publication Z-103. H. B. Sherman Mfg. Company, Battle Creek, Michigan.

163. TIME CONTROL DEVICES — Engineering data on automatic reset timers and Time Delay Relays suitable to control hundreds of industrial operations. Numerous specific applications described. Paragon Electric Co., 409 South Dearborn Street, Chicago, Ill.

164. INSULATING VARNISHES AND COMPOUNDS—40-page catalog assists in selection of the right insulating varnish or compound to meet any specific requirement. Contains helpful temperature conversion and tank capacity tables. Lists and describes all standard grades of DOLPH air drying and baking insulating varnishes and compounds. John C. Dolph Company, 166 Emmett Street, Newark, New Jersey.

165. TECHNICAL DATA ON J-M TRANSITE ASBESTOS - CEMENT ELECTRICAL DUCTS—including installation and special fitting data on J-M Transite Electrical Conduit and Korduct—a bound set of technical data sheets on the two asbestos-cement duct materials. Primarily prepared for designing engineer and installation supervisor, the 42-page book is chuck-full of practical information for anyone concerned with underground or overhead duct installations. Tables giving dimensions of ducts and fittings and numerous installation photographs are included. Copies of the book, Form DS Series 410, may be obtained upon request to Johns-Manville, 22 East 40th Street, New York City.

166. ATTIC FAN MANUAL—New 6-page bulletin entitled, "Hy-Duty Ventilators for Every Use"—Form No. 347-A—specifications, data and information on the installation of Fresh Air Maker Ventilators. New 4-page folder entitled, "Your Patrons Like A Fresh-Crisp Atmosphere"—Form No. 402—descriptive of the Fresh Air Maker for commercial purposes. Schwitzer-Cummins Company, Heating Division, Indianapolis, Ind.

167. NATIONAL ELECTRIC ENGINEERING DATA BOOK—A 350-page engineering data book and catalog of National Electric Products is now available. In addition to the section containing tables and wiring data, this publication includes complete catalog specifications and prices on conduit, industrial busways, surface raceways, "Plug-In" strips, armored cable, flexible tubing, "Gorilla Grips," brackets and wireholders, fuses, and wire and cable. A special feature of the publication is a listing of the Federal specifications with which the National Electric Products comply. National Electric Products Corporation, Pittsburgh, Pa.

168. GREENLEE TOOL CATALOG NO. 33-E — A 48-page catalog of GREENLEE TOOLS for bending conduit and tubing, pushing pipe underground, pulling in cable, punching holes in steel cabinets and panels, boring holes in wood and doing various other operations. Greenlee Tool Co., 1766 Columbia Ave., Rockford, Ill.

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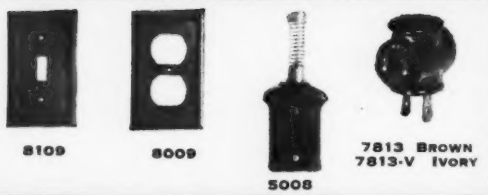

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